Electronic Services - Los Angeles
M131166X



GENERAL ELECTRIC

STARLINE

# CATV AMPLIFIER Models SA-*AW and SA-*AW-VI

**Serial Numbers up to and including No. 57541†**

## MAINTENANCE

### 1.0 INTRODUCTION

This instruction sheet contains circuit descriptions, troubleshooting procedures, alignment procedures, parts lists and schematics required for servicing Starline Amplifier Models SA-*AW and SA-*AW-VI. Refer to Jerrold Instruction Sheets 435-533-1 Part A and 435-533-1 Part B for installation and operation instructions respectively.

### GENERAL DESCRIPTION OF AMPLIFIERS AND AUXILIARY UNITS

The Starline series of Jerrold CATV equipment is a group of compact, cable-powered, solid-state, amplifiers and auxiliary units. The group comprises:

a. Six main trunk station types, Models SA-1AW, SA-2AW, SA-3AW, SA-4AW, SA-5AW, SA-6AW, in aluminum housings. The VI series are identical to the above except that this series has cast-iron housings.
b. Line splitters, Models SO-1 and SO-1W, SO-2 and SO-2W, SO-3 and SO-3W, SO-4 and SO-4W, and Models FM-1, FM-2, FM-3 and FM-4.
c. Models SXP-*, Plug-in pads for up to 12 dB of attenuation.
d. Equalizer Networks, Models SE-*A and SE-*AW, SE-*1500, and SE-*1750.
e. Power Supply, Model SPS-12.**
f. A.C./R-F Combiner, Model SPJ-2.
g. Thermal Equalizer Network, Models STE-W.
h. Hybrid Splitter/Mixer, Model SHS-2.
i. Directional Couplers, Models SDC-8, SDC-12, and SDC-16.
j. Line Extension Amplifiers, Models SX-1A, SX-1B, SLE-1A and SLE-1B.
k. Accessories such as auxiliary mounting brackets, cable fittings and test fittings.

Units are available in VI versions having cast-iron housings.

### 1.1 MAIN TRUNK STATIONS

#### 1.1.1 GENERAL

Each model is designed to fulfill a specific function; all six models thus provide all the functions that may be required of such equipment in a CATV system.

Each main trunk station consists of a Starline housing with one of two types of built-in connector chassis and a plug-in amplifier module with a d.c. power supply sub-chassis. One type connector chassis is common to Models SA-1AW, SA-2AW, SA-5AW and SA-6AW; the second type is common to Models SA-3AW and SA-4AW. The d.c. power supply sub-assembly is common to all six amplifier plug-in modules.

Main trunk stations can be equipped with surge protectors Model AS-1. Usually two protectors are employed at an SA-* amplifier; one at the trunk line input, one at the trunk line output terminal. Complete data and installation procedures are given in Jerrold Instruction Sheet 435-612.

#### 1.1.2 MODEL SA-1AW

This is a fully equipped trunk line and bridging amplifier station for the 54 to 216 MHz range, with automatic and manual gain control, as well as temperature-stabilized gain circuitry throughout. This model is usually required at every third trunk line station where one to four distribution lines are to be connected and where AGC circuitry is necessary to maintain a constant amplifier output. Distribution lines are established through plug-in splitter Models SO-* for one, two, three, or four lines respectively.

The amplifier circuit stages are made up of solid-state components on printed circuit boards built into shielded chassis compartments. Optional Model SE-* adjustable equalizers, and optional Model SXP-* plug-in attenuator pads, plus the built-in

†Serial Nos. 57542 and above operate on 13.25 d.c. voltages. A complementary Instruction Sheet for these amplifiers will be published.
**Type W for pole or surface mounting, type P for pedestal mounting, and VI for underground installation.

gain and tilt controls for both trunk line and bridging amplifier circuits, permit adjusting the amplifier to attain specified system operating parameters. Test fittings are provided for checking trunk input, trunk output, and bridging output signal levels. Tip jacks permit testing a.c., B+ and B— voltages. The regulated power supply built onto the amplifier plug-in module has the rectifier, filter, and regulating networks necessary for converting the a.c. input to the d.c. voltages required for powering the amplifier stages. The entire amplifier module plugs into the connector chassis of the STARLINE housing.

The connector chassis has screw and crown washer terminals for trunk input, trunk output, and four distribution lines. Four fuse holders serve to fuse each individual distribution line. The fuses are supplied separately with the Model SO-* splitters. A plug-type switch permits establishing a.c. entry and bypass conditions planned for the particular main trunk station. A.C. can be applied to the station either through the input or through the output terminal. With the switch in THROUGH position, the bypass circuitry permits driving other amplifiers ahead of or past the SA-1AW station. Five fittings on the connector chassis accept any one of the plug-in splitter models. The housing itself has six threaded apertures accepting VSF-type fittings for direct introduction of aluminum-sheathed or polyethylene-jacketed cables. Three additional apertures, sealed by wire-secured plugs, give access to the test fittings while the housing is closed and the station is operating. Heavily galvanized steel clamps and bolts, which can be installed either on top or on the rear wall of the housing, permit messenger mounting in various positions, independent of pole locations. Two special gaskets between its hinged lid and body make the STARLINE housing air-tight and r-f radiation-proof. A maintenance chart is provided in the housing lid for the convenience of operating personnel.

### 1.1.3 MODEL SA-2AW

This unit is the same as the SA-1AW but without AGC circuitry. It is used at locations where distribution lines are required, but where no automatic gain control is needed.

### 1.1.4 MODEL SA-3AW

This unit is the same as the SA-1AW but without bridging amplifier circuitry. It is used at locations where AGC is needed but no distribution lines are required.

### 1.1.5 MODEL SA-4AW

This unit has trunk line amplifier circuitry only. It is used as a main trunk line cascader; e.g., in open areas.

### 1.1.6 MODEL SA-5AW

This model is an intermediate bridging amplifier used at trunk line points where trunk line signal amplification is not required but where one to four distribution lines are to be created. Model SA-5AW has a built-in equalizer circuit for 11 dB of cable compensation at channel 13.

### 1.1.7 MODEL SA-6AW

This unit is a distribution amplifier, having the same circuitry as the trunk line amplifier in Models SA-1AW through SA-4AW; it has no AGC or bridging amplifier circuitry. The unit is used at the end of a main trunk line for branching it into up to four distribution or sub-trunk lines, or in distribution lines for creating up to four additional lines with amplified signals.

### 1.1.8 PLUG-IN SPITTERS MODELS SO-* AND FM-* (1)

These units serve to branch the output of the bridging amplifier in Models SA-1AW, SA-2AW, SA-5AW and SA-6AW into 1, 2, 3, or 4 distribution lines respectively. The splitters plug into the connector chassis of these trunk station housings and are supplied separately according to systems requirements. Each splitter is shipped with the appropriate number of fuses.

### 1.1.9 EQUALIZERS MODELS SE-*

Models SE-* are factory-adjusted equalizers designed to compensate for tilt in 8, 12, or 17 dB of air-dielectric, JT-1500, or JT-1750 type of cable. The units can be adjusted in the field where the specific tilt or attenuation characteristics in installed cable is found to deviate from nominal. The equalizer boards are designed for mounting in sandwich fashion on top of the adapter board in the trunk line amplifier input stage of an SA-* plug-in module. For details refer to Jerrold Instruction Sheet 435-582.3 packed with each equalizer.

(1) For replacement or for expanding systems, the later Models FM-* only should be ordered.

## 2.1 SPECIFICATIONS — MODEL SA-1AW, SA-1AW-VI

| | |
|---|---|
| FREQUENCY RANGE | OVERALL: 50 to 220 MHz; OPERATING: 54 to 216 MHz. |
| RESPONSE FLATNESS | TRUNK LINE AMP.: ±0.25 dB; BRIDGING AMP.: ±0.5 dB |
| GAIN | TRUNK LINE AMP.: Min. Full Gain, 26 dB†<br>Operational Gain for 12 channels with up to 50 amplifiers in cascade, 22 dB |
| | BRIDGING AMP.: Min. Full Gain, 18 dB; Operational Gain for 12 channels, 17 dB |
| GAIN CONTROL RANGE (Manual) | Continuously variable 7 dB down from maximum gain.<br>Further reduction up to 12 dB by SXP-* pads. |
| AGC Carrier frequency<br>Gain<br>Op. Level recommended<br>Compensation | 73.5 MHz<br>22 dB<br>16 dBmV<br>±4 dB fluctuations in input result in ±0.5 dB max. fluctuations in output. |
| MINIMUM OUTPUT CAPABILITY† for —57 dB cross-mod., and where 5 dB block-tilt technique is used. | TRUNK LINE AMP.: 55 dBmV per ch. for 2 channels<br>49 dBmV per ch. for 9 channels<br>48 dBmV per ch. for 12 channels |
| | BRIDGING AMP.: 55 dBmV per ch. for 2 channels<br>49 dBmV per ch. for 9 channels<br>48 dBmV per ch. for 12 channels |
| TYPICAL OPERATING LEVELS for 12-ch. operation; up to 50 amps. in cascade. | INPUT: 9‡ dBmV OUTPUT: 31† dBmV |
| CASCADABILITY | 50 amplifiers for 12-ch. operation at cross-mod. of —57 dB and S/N ratio of 40 dB. |
| NOISE FIGURE | TRUNK LINE AMP.: 8 dB max. at channel 2; 11 dB max. at channel 13 |
| DISTORTION<br>CROSS-MODULATION<br>S/N RATIO<br>HUM-MODULATION | —91 dB at +31 dBmV output<br>57 dB at +9 dBmV input<br>—60 dB or better |
| TERMINAL MATCH at LINE IN, LINE OUT, DISTR. OUT (E1, E2, E3, E4) terminals | 16 dB min. return loss (max. VSWR 1.38:1) relevant to impedance of 75 Ω and frequency range 54 to 216 MHz. |
| TILT CONTROL RANGE (additional cable equalization at trunk line amp. input by Models SE-*) | TRUNK LINE AMP.: Variable for an equivalent of up to 7 dB of cable at 216 MHz. |
| | BRIDGING AMP.: Variable ±2 dB, linear across 54 to 216 MHz. |
| INSERTION LOSS at bridging amplifier | 1 dB |
| OPERATING AMBIENT TEMPERATURE RANGE | —40° to +140°F (—40° to +60°C) |
| R-F RADIATION SUPPRESSION | Housing r-f radiation suppression is comparable to that of aluminum sheathed cable. |
| POWER REQUIREMENTS (rms voltage and current) | 22 to 30 V, 1 A max. |
| DIMENSIONS | 16″ x 8″ x 4″ |
| WEIGHT | With al. housing, 15 lbs.; with cast-iron housing, 28 lbs. |

†Subtract 1 dB for bridging amplifier insertion loss.
‡Add 1 dB for Models SE-* insertion loss.

## 2.2 SPECIFICATIONS — MODEL SA-2AW, SA-2AW-VI

| | |
|---|---|
| FREQUENCY RANGE | OVERALL: 50 to 220 MHz, OPERATING: 54 to 216 MHz |
| RESPONSE FLATNESS | TRUNK LINE AMP.: ±0.25 dB; BRIDGING AMP.: ±0.5 dB |
| GAIN | TRUNK LINE AMP.: Min. Full Gain, 26 dB†<br>Operational Gain for 12 channels with up to 50 amplifiers in cascade, 22 dB |
| | BRIDGING AMP.: Min. Full Gain, 18 dB; Operational Gain for 12 channels, 17 dB |
| GAIN CONTROL RANGE | Continuously variable 7 dB down from maximum gain.<br>Further reduction up to 12 dB by SXP-* pads. |
| MINIMUM OUTPUT CAPABILITY† for —57 dB cross-mod., and where 5 dB block-tilt technique is used. | TRUNK LINE AMP.: 55 dBmV per ch. for 2 channels<br>49 dBmV per ch. for 9 channels<br>48 dBmV per ch. for 12 channels |
| | BRIDGING AMP.: 55 dBmV per ch. for 2 channels<br>49 dBmV per ch. for 9 channels<br>48 dBmV per ch. for 12 channels |
| TYPICAL OPERATING LEVELS for 12-ch. operation; up to 50 amps. in cascade. | INPUT: 9‡ dBmV OUTPUT: 31† dBmV |
| CASCADABILITY | 50 amplifiers for 12-ch. operation at cross-mod. of —57 dB and S/N ratio of 40 dB. |
| NOISE FIGURE | TRUNK LINE AMP.: 8 dB max. at channel 2; 11 dB max. at channel 13 |
| DISTORTION<br>CROSS-MODULATION<br>S/N RATIO<br>HUM-MODULATION | —91 dB at +31 dBmV output<br>57 dB at +9 dBmV input<br>—60 dB or better |
| TERMINAL MATCH at LINE IN, LINE OUT, DISTR. OUT (E1, E2, E3, E4) terminals | 16 dB min. return loss (max. VSWR 1.38:1) relevant to impedance of 75Ω and frequency range 54 to 216 MHz. |
| TILT CONTROL RANGE (additional cable equalization at trunk line amp. input by Models SE-*) | TRUNK LINE AMP.: Variable for an equivalent of up to 7 dB of cable at 216 MHz. |
| | BRIDGING AMP.: Variable ±2 dB, linear across 54 to 216 MHz. |
| INSERTION LOSS at bridging amplifier | 1 dB |
| OPERATING AMBIENT TEMPERATURE RANGE | —40° to +140°F (—40° to +60°C) |
| R-F RADIATION SUPPRESSION | Housing r-f radiation suppression is comparable to that of aluminum sheathed cable. |
| POWER REQUIREMENTS (rms voltage and current) | 21 to 30 V, 0.9 A max. |
| DIMENSIONS | 16″ x 8″ x 4″ |
| WEIGHT | With al. housing, 15 lbs.; with cast-iron housing, 28 lbs. |

†Subtract 1 dB for bridging amplifier insertion loss.
‡Add 1 dB for Models SE-* insertion loss.

## 2.3 SPECIFICATIONS — MODEL SA-3AW, SA-3AW-VI

| | |
|---|---|
| FREQUENCY RANGE | OVERALL: 50 to 220 MHz; OPERATING: 54 to 216 MHz |
| RESPONSE FLATNESS | ±0.25 dB |
| GAIN | Min. Full Gain, 26 dB<br>Operational Gain for 12 channels with up to 50 amplifiers in cascade, 22 dB |
| GAIN CONTROL RANGE (Manual) | Continuously variable 7 dB down from maximum gain.<br>Further reduction up to 12 dB by SXP-* pads. |
| AGC Carrier frequency<br>Gain<br>Op. Level recommended<br>Compensation | 73.5 MHz<br>22 dB<br>16 dBmV<br>±4 dB fluctuations in input result in ±0.5 dB max. fluctuations in output |
| MINIMUM OUTPUT CAPABILITY for —57 dB cross-mod., and where 5 dB block-tilt technique is used | 55 dBmV per ch. for 2 channels<br>49 dBmV per ch. for 9 channels<br>48 dBmV per ch. for 12 channels |
| TYPICAL OPERATING LEVELS for 12-ch. operation; up to 50 amps. in cascade. | INPUT: 9† dBmV OUTPUT: 31 dBmV |
| CASCADABILITY | 50 amplifiers for 12-ch. operation at cross-mod. of —57 dB and S/N ratio of 40 dB. |
| NOISE FIGURE | 8 dB max. at channel 2; 11 dB max. at channel 13 |
| DISTORTION<br>CROSS-MODULATION<br>S/N RATIO<br>HUM-MODULATION | <br>—91 dB at +31 dBmV output<br>57 dB at +9 dBmV input<br>—60 dB or better |
| TERMINAL MATCH at LINE IN, LINE OUT terminals | 16 dB min. return loss (max. VSWR 1.38:1) relevant to impedance of 75 Ω and frequency range 54 to 216 MHz. |
| TILT CONTROL RANGE (additional cable equalization at trunk line amp. input by Models SE-*) | Variable for an equivalent of up to 7 dB of cable at 216 MHz. |
| OPERATING AMBIENT TEMPERATURE RANGE | —40° to +140°F (—40° to +60°C) |
| R-F RADIATION SUPPRESSION | Housing r-f radiation suppression is comparable to that of aluminum sheathed cable. |
| POWER REQUIREMENTS (rms voltage and current) | 21 to 30 V, 0.75 A Max. |
| DIMENSIONS | 16" x 8" x 4" |
| WEIGHT | With al. housing, 15 lbs.; with cast-iron housing, 28 lbs. |
| †Add 1 dB for Models SE-* insertion loss. | |

## 2.4 SPECIFICATIONS — MODEL SA-4AW, SA-4AW-VI

| | |
|---|---|
| FREQUENCY RANGE | OVERALL: 50 to 220 MHz; OPERATING: 54 to 216 MHz |
| RESPONSE FLATNESS | ±0.25 db |
| GAIN | Min. Full Gain, 26 dB<br>Operational Gain for 12 channels with up to 50 amplifiers in cascade, 22 dB |
| GAIN CONTROL RANGE (Manual) | Continuously variable 7 dB down from maximum gain.<br>Further reduction up to 12 dB by SXP-* pads. |
| MINIMUM OUTPUT CAPABILITY for —57 dB cross-mod., and where 5 dB block-tilt technique is used. | 55 dBmV per ch. for 2 channels<br>49 dBmV per ch. for 9 channels<br>48 dBmV per ch. for 12 channels |
| TYPICAL OPERATING LEVELS for 12-ch. operation; up to 50 amps. in cascade. | INPUT: 9† dBmV OUTPUT: 31 dBmV |
| CASCADABILITY | 50 amplifiers for 12-ch. operation at cross-mod. of —57 dB and S/N ratio of 40 dB. |
| NOISE FIGURE | 8 dB max. at channel 2; 11 dB max. at channel 13. |
| DISTORTION<br>CROSS-MODULATION<br>S/N RATIO<br>HUM-MODULATION | <br>—91 dB at +31 dBmV output<br>57 dB at +9 dBmV input<br>—60 dB or better |
| TERMINAL MATCH at LINE IN, LINE OUT terminals | 16 dB min. return loss (max. VSWR 1.38:1) relevant to impedance of 75 Ω and frequency range 54 to 216 MHz. |
| TILT CONTROL RANGE (additional cable equalization at trunk line amp. input by Models SE-*) | Variable for an equivalent of up to 7 dB of cable at 216 MHz. |
| OPERATING AMBIENT TEMPERATURE RANGE | —40° to +140°F (—40° to +60°C) |
| R-F RADIATION SUPPRESSION | Housing r-f radiation suppression is comparable to that of aluminum sheathed cable. |
| POWER REQUIREMENTS (rms voltage and current) | 20 to 30 V, 0.6 A max. |
| DIMENSIONS | 16" x 8" x 4" |
| WEIGHT | With al. housing, 15 lbs.; with cast-iron housing, 28 lbs. |
| †Add 1 dB for Models SE-* insertion loss. | |

## 2.5 SPECIFICATIONS — MODEL SA-5AW, SA-5AW-VI

| | |
|---|---|
| FREQUENCY RANGE | OVERALL: 50 to 220 MHz; OPERATING: 54 to 216 MHz |
| RESPONSE FLATNESS | ±0.5 dB |
| GAIN | Min. Full Gain, 33 dB<br>Operational Gain for 12 channels, 24-32 dB |
| GAIN CONTROL RANGE | Continuously variable 7 dB down from maximum gain.<br>Further reduction up to 12 dB by SXP-* pads. |
| MINIMUM OUTPUT CAPABILITY for —57 dB cross-mod., and where 5 dB block-tilt technique is used. | 55 dBmV per ch. for 2 channels<br>49 dBmV per ch. for 9 channels<br>48 dBmV per ch. for 12 channels |
| NOISE FIGURE | 26 dB max. at channel 2; 22 dB max. at channel 13 |
| DISTORTION<br>CROSS-MODULATION<br>S/N RATIO<br>HUM-MODULATION | <br>—57 dB at +48 dBmV output<br>53 dB at +15 dBmV input<br>—60 dB or better |
| TERMINAL MATCH at LINE IN, LINE OUT, DISTR. OUT (E1, E2, E3, E4) terminals | 18 dB min. return loss (max. VSWR 1.29:1)<br>16 dB min. return loss (max. VSWR 1.38:1) relevant to impedance of 75 Ω and frequency range 54 to 216 MHz. |
| TILT CONTROL RANGE | Variable ±2 dB, linear across 54 to 216 MHz.<br>(Compensates for 7 to 15 dB of cable at ch. 13) |
| INSERTION LOSS at bridging amplifier | 1.25 dB |
| OPERATING AMBIENT TEMPERATURE RANGE | —40° to +140°F (—40° to +60°C) |
| R-F RADIATION SUPPRESSION | Housing r-f radiation suppression is comparable to that of aluminum sheathed cable. |
| POWER REQUIREMENTS (rms voltage and current) | 20 to 30 V, 0.6 A max. |
| DIMENSIONS | 16" x 8" x 4" |
| WEIGHT | With al. housing, 15 lbs.; with cast-iron housing, 28 lbs. |

## 2.6 SPECIFICATIONS — MODEL SA-6AW, SA-6AW-VI

| | |
|---|---|
| FREQUENCY RANGE | OVERALL: 50 to 220 MHz; OPERATING: 54 to 216 MHz |
| RESPONSE FLATNESS | ±0.25 dB |
| GAIN | Min. Full Gain, 26 dB; Operational Gain, 24 dB |
| GAIN CONTROL RANGE (Manual) | Continuously variable 7 dB down from maximum gain.<br>Further reduction up to 12 dB by SXP-* pads. |
| MINIMUM OUTPUT CAPABILITY for —57 dB cross-mod., and where 5 dB block-tilt technique is used. | 48 dBmV per ch. for 12 channels |
| TYPICAL OPERATING LEVELS for 12-ch. operation | INPUT: 24 dBmV for highband channels†; 19 dBmV for lowband channels†<br>OUTPUT: 48 dBmV for highband channels; 43 dBmV for lowband channels |
| NOISE FIGURE (at full gain) | 8 dB max. at channel 2; 11 dB max. at channel 13 |
| DISTORTION<br>CROSS-MODULATION<br>S/N RATIO<br>HUM-MODULATION | <br>—57 dB at +48 dBmV output<br>72 dB at +24 dBmV input<br>—60 dB or better |
| TERMINAL MATCH at LINE IN, DISTR. OUT (E1, E2, E3, E4) terminals. | 16 dB min. return loss (max. VSWR 1.38:1) relevant to impedance of 75 Ω and frequency range 54 to 216 MHz. |
| TILT CONTROL RANGE (additional cable equalization at trunk line amp. input by Models SE-*) | Variable ±1.75 dB, linear across 54 to 216 MHz. |
| OPERATING AMBIENT TEMPERATURE RANGE | —40° to +140°F (—40° to +60°C) |
| R-F RADIATION SUPPRESSION | Housing r-f radiation suppression comparable to that of aluminum sheathed cable. |
| POWER REQUIREMENTS (rms voltage and current) | 20 to 30 V, 0.6 A max. |
| DIMENSIONS | 16" x 8" x 4" |
| WEIGHT | With al. housing, 15 lbs.; with cast-iron housing, 28 lbs. |

†Add 1 dB for Models SE-* insertion loss.

## 3.1 PLUG-IN MODULES

| Name of Control | Circuit Designation | Position | Function | Available on Model |
|---|---|---|---|---|
| RF IN TEST | TP-101 Chassis Fitting | | Permits checking R-F level at trunk input terminal | SA-1AW, SA-2AW, SA-3AW, SA-4AW, SA-6AW |
| RF OUT TEST | TP-102 Chassis Fitting | | Permits checking trunkline amplifier output levels | SA-1AW, SA-2AW, SA-3AW, SA-4AW, SA-5AW |
| DIST TEST | TP-103 Chassis Fitting | | Permits checking bridging output levels | SA-1AW, SA-2AW, SA-5AW, SA-6AW |
| LINE TILT | R-313 Potentiometer | | Permits varying equalization tilt of trunk amplifier output from 12 to 24 dB | SA-1AW, SA-2AW, SA-3AW, SA-4AW, SA-6AW |
| DIST TILT | R-414 Potentiometer | | Permits varying tilt of bridging amplifier output | SA-1AW, SA-2AW |
| TILT | R-615 Potentiometer | | Permits varying tilt of intermediate bridging amplifier output | SA-5AW |
| AGC-MAN | S-701 Slide Switch | AGC | AGC circuit operative; manual gain control circuit inoperative | SA-1AW SA-3AW |
| | | MAN | Manual gain control circuit inoperative; AGC circuit inoperative | |
| LINE GAIN | R326 (SA-2AW, SA-4AW, SA-6AW) R718 (SA-1AW, SA-3AW) Potentiometer | max. max. | Permits manual adjustment of trunk line amplifier gain | SA-1AW, SA-2AW, SA-3AW, SA-4AW, SA-6AW |
| DIST GAIN | R-403 Potentiometer | | Permits manual adjustment of bridging amplifier gain | SA-1AW, SA-2AW |
| GAIN | R-613 Potentiometer | | Permits manual adjustment of intermediate bridging amplifier gain | SA-5AW |
| AC TEST | TP-106 Tip Jack | | Permits checking A.C. input voltage | All models |
| B+ TEST | TP-104 Tip Jack | | Permits checking B+ voltage | All models |
| B— TEST | TP-105 Tip Jack | | Permits checking B— voltage | All models |

## 3.2 CONNECTOR CHASSIS

| Name of Control | Circuit Designation | Position | Function | Available on Model |
|---|---|---|---|---|
| POWER | 4 pin socket, 3 pin plug | IN | Station powered thru input terminal; power not passed on | All models |
| | | OUT | Station powered thru output terminal; power not passed on | |
| | | THRU | Station powered thru input or output terminal; passing power on | |
| | | OFF | Station itself not powered but passing power on | |
| LINE IN | Terminal assembly | | Trunk line input terminal | All models |
| LINE OUT | Terminal assembly | | Trunk line output terminal | SA-1AW, SA-2AW, SA-3AW, SA-4AW, SA-5AW |
| DIST IN | P-103 Chassis Fitting | | Accepts bridging amplifier output terminal | SA-1AW, SA-2AW, SA-5AW |
| DIST OUT | Chassis Fitting | | Accepts Model SO-* splitter input terminal | SA-1AW, SA-2AW, SA-5AW, SA-6AW |
| FS1, FS2, FS3, FS4 | FS1, FS2, FS3, FS4 Fuse holders | | Individual fusing of feeder lines | SA-1AW, SA-2AW, SA-5AW, SA-6AW |
| E1, E2, E3, E4 | Screw and crown washer terminals | | Connections for feeder line cables | SA-1AW, SA-2AW, SA-5AW, SA-6AW |
| 1, 2, 3, 4 | Chassis Fittings | | Feeder line outputs from splitter | SA-1AW, SA-2AW, SA-5AW, SA-6AW |
| AC | J-104 Chassis Fitting | | A.C. input terminal to plug-in module | All models |
| LINE | J-101, J-102 Chassis Fittings | | Trunk line RF input to and output from plug-in module. SA-6AW in only. | SA-1AW, SA-2AW, SA-3AW, SA-4AW, SA-5AW |

## 4.1 D.C. POWER SUPPLY

The regulated d.c. power supply is common to all six main trunk station types. Its circuit description given here is not repeated in the description of the individual trunk station circuits.

The d.c. power supply receives the a.c. from the trunk line and converts it into the B+ and B− voltages (+15 V d.c. and −15 V d.c.) required for the r-f amplifiers.

A.C. enters the plug-in module at J104 which mates with P104 on the connector chassis of the Starline housing. From J104 a pin jack TP106 is brought out as AC TEST point on the plug-in chassis. R-F is blocked by L102 mounted in the plug-in chassis.

From L102 the a.c. voltage is applied through filter choke L101 to a voltage doubler rectifier consisting of diodes CR101 and CR107.

The positive d.c. voltage is filtered by C102 and C103 and then applied to a series regulator and filter network consisting of R101, R102, C104, Q101 and CR105. Transistor Q101 is protected against overloads by a current-limiting circuit consisting of R105, CR102, CR103 and CR104. From the junction of R105 and CR104 the B+ voltage is passed via a feed-thru capacitor C110 over one path into the trunk line amplifier circuit, from where a branch is brought out to pin jack TP104 as B+ TEST point on the plug-in chassis.

The B− voltage is processed in a similar manner in filter capacitors C106 and C107 and in series regulator network R103, R104, C108, Q102 and CR106. Regulator Q102 is protected by CR103, CR109 and R106. From the junction of R106 and CR109 the B− voltage is fed through C112 and then connected to the trunk line amplifier circuit, with a branch brought out to pin jack TP105 as B− TEST point on the plug-in chassis.

In Models SA-1AW and SA-2AW additional positive and negative voltage paths are provided through C111/L103 and C113/L104 respectively for the bridging amplifier circuit board.

## 4.2 TRUNK LINE AMPLIFIER

The trunk line amplifier section is common to Models SA-1AW, SA-2AW, SA-3AW, SA-4AW and SA-6AW.

The circuitry occupies an etched board for the amplifier itself and an etched board designed for accommodating a cable equalizer network and a plug-in attenuator pad. Models SA-2AW, SA-4AW and SA-6AW have a separately mounted manual gain control circuit.

The r-f signal enters the plug-in chassis at terminal J101, is passed through the terminals of plug-in pad jack J201 and through the equalizer mounting terminals E5/E6 and is then coupled through C206 and L204 to the input stage of Q301 of the r-f amplifier. This and all other amplifier stages have a common emitter circuit configuration.

From J101 the input signal is sampled for test point TP101, brought out in form of a push-on fitting RF TEST IN mounted on the plug-in chassis. C201 permits adjusting impedance match for the input terminal.

On the trunk line circuit board the incoming r-f signal is coupled through C301 to the base of Q301. Base current is provided through bias resistors R303 and R304 with the latter providing bias stabilization. The output of Q301 is coupled through C303 to the base of the second stage Q302. Transformer T301 provides impedance match between the collector of Q301 and the base of Q302. Base bias for Q302 is furnished by R306, R307 and R308. R306 acts as bias stabilizer.

The collector output of Q302 is passed through a tunable network L302, C323 and coupled through C306 to a temperature compensating network consisting of thermistor RT301, R27, L303 and R311. From there the signal is applied to the base of Q303.

Q303 and Q304 are arranged in a "bridged T" attenuation network acting as a gain reduction circuit which can be manually controlled by LINE GAIN potentiometer R326 (Models SA-2AW, SA-4AW and SA-6AW) or R718 (Models SA-1AW and SA-3AW).

In addition to this variable gain reduction, a fixed gain reduction plug-in pad can be employed at J201. Pads are available for 0.5, 1.0, 1.5, 2.0, 2.5, 3, 6, 9, and 12 dB of attenuation for replacing the 0-dB pad plugged into shelf units.

The output of Q303 is coupled through C310 to the base of the next stage Q305. A portion of the output of Q305 is fed back through transformer T303 and a parallel network L304, C322 resonating at 216 MHz and then through R316 to the LINE TILT control R313.

This control permits compensation for variations in cable tilt, apart from equalization obtainable by using equalizer networks which can be mounted on the input stage adapter board.

The collector output of Q306 is passed through an impedance matching transformer T304 and coupled through C314 to the plug-in terminal J102 which mates with an appropriate fitting P102 on the connector chassis in the station housing.

A sample of the output signal is passed to test point TP102, brought out in form of a push-on fitting RF TEST OUT on the plug-in chassis.

In Models SA-3AW and SA-4AW trimmers C10 and C12 adjust the impedance match at the output terminal; in Models SA-1AW and SA-2AW similar trimmers C401 and C421 are incorporated on the bridging amplifier circuit board. In Model SA-6AW trimmer C10 only adjusts match.

On Models SA-1AW and SA-3AW, the tap of the directional coupling network T305, C321 and R323 connects to the AGC circuit; the line output of the coupler serves to branch a portion of the signal into the bridging amplifier. In Models SA-2AW, SA-4AW and SA-6AW only the line portion of the coupler is active.

## 4.3 AUTOMATIC GAIN CONTROL CIRCUITRY

The AGC circuitry is common to Models SA-1AW and SA-3AW. It is mounted on a separate etched board in a shielded compartment of the plug-in chassis.

The AGC circuit consists of a preselector stage, an r-f amplifier, a d.c. detector, a d.c. amplifier and a differential amplifier stage.

A portion of the trunk line amplifier output is fed through the tap of directional coupling network T305, C321, R323 and then coupled through network L711, C718 into the preselector stage L709, L710. This stage is mounted within a shielded compartment, recessed in the bottom of the plug-in chassis.

The preselector is tuned to the pilot carrier frequency of 73.5 MHz introduced at the head-end.

From the preselector the signal is coupled through C717 to the base of the first r-f amplifier stage Q707. This and all following r-f amplifier stages are arranged in a common emitter configuration. Base bias for Q707 is provided by R721 and R722.

The output of Q707 is passed through impedance matching transformer T702 and through C712 into the manual LINE GAIN control R718 incorporated here on the etched circuit board.

In this circuit, with the AGC-MAN switch S701 set to AGC position, R718 acts as a threshold level control for the AGC circuit. With switch S701 set to MAN position, R718 acts through the differential amplifier stage as a level control for the gain reduction circuit in the trunk line amplifier itself; it operates in a similar manner as the LINE GAIN control in Models SA-2AW, SA-4AW and SA-6AW, where the control is mounted separately.

With the switch in MAN position, the entire r-f amplifier section of Q706, Q705 and Q704 is disconnected.

The output of Q706 is coupled through C706 to the base of Q705 with T701 providing impedance match. Base bias for Q705 is provided by R713 and R714.

From the collector of Q705 the signal is fed to a voltage-doubling detector stage CR701 and CR702 whose output is filtered by C702 and kept constant by thermistor TR701.

With switch S701 in AGC position, the detector output is applied to the base of the first d.c. amplifier Q704 whose output in turn provides base current for the second d.c. amplifier Q703, arranged in a common collector circuit.

The Q703 emitter output drives the differential amplifier stage Q702, Q701. The output of this amplifier then drives the gain reduction circuit stage in the trunk line amplifier. Filter capacitor C732 prevents 60 Hz hum modulation of the gain reduction circuit.

## 4.4 BRIDGING AMPLIFIER

The bridging amplifier circuitry is common to Models SA-1AW and SA-2AW. The components are interconnected on an etched board mounted in a shielded compartment of the plug-in chassis.

The output of the trunk line amplifier is passed to a directional coupling network consisting of T401, T402 and R401 in the input stage of the bridging amplifier.

From this network the major portion of the signal is passed through R1 and coupling network C28, L15 to the trunk line output terminal J102. C401 and C421 accomplish impedance transfer.

The smaller portion of the signal is coupled through capacitor C420 to a temperature compensating network consisting of RT401, R404, and R426. The signal is then applied to a gain reduction circuit consisting of potentiometer R403 and resistor R402 and then coupled through C402 to the base of Q401. This stage and all following stages are arranged in common emitter circuit configurations.

The collector output of Q401 is coupled through C407 to the base of the second stage Q402, with T403 providing impedance match. A portion of the collector output of Q402 is fed back through DIST TILT control R414; this control is factory-adjusted and will need field adjustment only where system requirements call for a deviation from 5 dB block tilt at the output of the bridging amplifier.

The other portion of the collector output of Q402 is coupled through C410 to the base of Q403 arranged in a d.c. series circuit with Q402. The output of Q403 is coupled through C414 to the base of the output stage Q404.

The collector output of Q404 is coupled through C420 to the output terminal J103 which mates with the DIST IN push-on fitting P103 on the connector chassis of the Starline housing. T406, L407 provide impedance match at the output terminal.

From the junction of C420 and J103 a test point TP103 is brought out in form of a push-on fitting DIST TEST on the plug-in chassis.

From the DIST IN fitting of the connector chassis the signal is passed to the DIST OUT fitting on

the connector chassis; the latter fitting mates with the IN fitting on the SO-type plug-in splitters.

## 4.5 INTERMEDIATE BRIDGING AMPLIFIER

This circuitry is found in Model SA-5AW only. The connector chassis used with the Starline housing, however, is the same as used with Models SA-1AW and SA-2AW.

The intermediate bridging amplifier circuitry is accommodated on two etched boards; one with a directional coupler and an equalizer network, the other with the amplifier circuit itself.

The trunk line signal is coupled through C508 to a directional coupling network on the first printed circuit board; this network consists of T501, T502, R501, C503. Trimmer C501 adjusts the impedance match at the input terminal J101.

From the primary of T501 the major portion of the input signal is passed to the trunk line output terminal J102. The smaller portion of the signal is fed to the equalizer network consisting of C505, C506, C507, L501, L502, L503, R502, R503, R504, and R506. This network is designed to compensate for tilt in cable of a length equivalent to 11 dB.

From the equalizer the signal is passed to a gain/frequency compensating network consisting of thermistor RT1, and of C632, L611 and R634 arranged in a series-parallel circuit. Compensation is achieved by RT1 raising or lowering the input signal level against a falling or rising gain level caused by temperature changes.

From the output of the compensating circuit the signal is passed through the plug-in pad jack terminals J601 and coupled through C602 to the base of Q601. C601 compensates for stray inductances.

Q601 and all following stages are arranged in a common emitter circuit configuration. Q601 and Q602 constitute a d.c. series circuit with T601 providing impedance match for the interstage and C606 acting as coupling capacitor.

The output of Q602 is coupled through C608 to a variable gain reduction circuit consisting of R612, R614, C609 and GAIN potentiometer R613. Transformer T602 provides impedance match for this interstage.

From R613 the signal is coupled through C613 to the base of Q603. A portion of the Q603 collector output is fed back through TILT control R615; this control permits varying the fixed cable compensation of 11 dB available from the equalizer at the input stage by ±4 dB.

The other portion of the collector output of Q603 is coupled through C616 to the base of Q604 with T603 providing impedance match between the stages. Q604 and Q605 again are arranged in a d.c. series circuit, with T604 providing impedance match and C620 acting as coupling capacitor.

The collector of Q605 is coupled through C623 to the base of the output stage Q606. Transformer T605 matches the impedance between the collector of Q605 and the base of Q606; transformer T606 matches the impedance of the collector of Q606 to the output terminal J103, with trimmer C630 permitting match adjustment. C629 is the output coupling capacitor.

The amplifier output terminal J103 mates with the DIST IN fitting on the connector chassis of the Starline housing; from there the signal passes to the DIST OUT fitting on the connector chassis. This fitting mates with the IN fitting on an SO-type plug-in splitter.

From a tie-point between L605 and C629 a test point TP103 is coupled through C631 to the amplifier output and brought out as DIST TEST fitting on the plug-in chassis.

In the SA-5AW intermediate bridging amplifier station, an RF OUT TEST and a DIST OUT TEST fitting are available; no RF IN TEST point is included here (see Chart of Controls and Connections).

## 4.6 MODEL SA-6AW

Apart from the d.c. power supply this module contains only an amplifier circuit which has the same configuration as the trunk line amplifier in Model SA-1AW, except that the output is passed to the push-on fitting DIST OUT on the connector chassis. With an SO-* type splitter plugged into the chassis, up to four distribution lines can be fed through terminals E1, E2, E3 and E4.

Line gain in this amplifier is adjustable by a separate gain control circuit employing dual potentiometer R326A/R326B. This circuit is similar to that described for Model SA-2AW. The LINE OUT terminal found in the other trunk line amplifier circuitry is not used in Model SA-6AW; however, a test point TP103 in form of a push-on fitting DIST OUT TEST permits checking the output signal level before the signal enters a plugged-in splitter. This test point has the same location on the module chassis as the RF OUT TEST fitting on Model SA-1AW.

## 5.1 INTRODUCTION

The maintenance section deals with the troubleshooting, repair and alignment of a faulty amplifier plug-in module. It is assumed that where a faulty unit has been located it was replaced by a spare plug-in so that signal distribution will suffer only a minimum of interruption.

It is also assumed that system operators have adequate facilities and instruments, as well as personnel familiar with solid-state and printed circuitry. Where such facilities and personnel are not available, equipment repair should not be attempted. In such a case, the faulty unit should be returned to Jerrold's Servicing Department where it will be repaired at no charge under warranty conditions; otherwise it will be repaired at a nominal charge. All equipment so returned must be shipped with all freight and insurance charges prepaid, and must be accompanied by a letter quoting unit serial number(s) and stating the difficulties encountered.

## 5.2 GENERAL

**5.2.1** An inoperative plug-in module coming in for bench test and repair will usually be accompanied by some statement about the trouble; e.g. "no d.c." or "low r-f at bridging output." The procedures given here will permit testing and repairing a plug-in module, even where no statement about the condition of the unit is at hand, by dealing with the individual circuit boards as found in an SA-* station according to Table 1.

**TABLE 1. SA-* CIRCUIT BOARDS**

| | |
|---|---|
| a. D.C. Power Supply | All, Models SA-1AW thru SA-6AW |
| b. Trunk Line Amplifier | All, except Model SA-5AW |
| c. AGC Circuitry | Models SA-1AW and SA-3AW |
| d. Bridging Amplifier | Models SA-1AW and SA-2AW |
| e. Intermediate Bridging Amplifier | Model SA-5AW only |

The troubleshooting method consists of a sequence of d.c. voltage measurements tabulated for all transistor stages found in the above circuit boards. This method permits isolating a faulty transistor or a faulty passive component in the associated circuit. The relevant component location diagrams can be found on pages 18 thru 23. However, before beginning any measurements, the plug-in module received for servicing should first be closely inspected for any visible indication of faults such as a burnt resistor, a broken component lead, an open soldering joint, etc.

NOTES:

1. All voltages given in the tables and on the schematic circuit diagrams are measured to chassis ground.
2. All plug-in modules must be equipped with an SXP-0 pad before connection into a test circuit.
3. All plug-in modules — except Model SA-5AW which has a built-in fixed equalization circuit — must be equipped with a shorting strap across equalizer terminals E5 and E6 before connection into a test circuit.

### 5.2.2 TEST EQUIPMENT REQUIRED

The following instruments and accessories, or their equivalents, are required:

a. 22 V a.c. source, Jerrold Power Supply Model 407-P Ser. 2 (coax. lead equipped with a PF-59 push-on adapter).
b. Volt-Ohm-Meter, Triplett Model 800.
c. Sweep Generator, Jerrold Model 900-C or SS-300.
d. Coaxial Comparator, Jerrold Model FD-30 or TC-2.
e. Field Strength Meter, Jerrold Model 704-B or 727.
f. Variable Attenuators, two, Jerrold Model AV-75.
g. Oscilloscope, Tektronix Type 504.
h. Wideband Amplifier (Post-Amp.) Jerrold Model SCA-213ER.
i. Test Probe, Jerrold Model SPD-30.
j. 75 Ω Termination, Jerrold Model TR-75G.
k. 6-dB Pads, two, Jerrold Model PDL-6.

## 5.3 D.C. POWER SUPPLY

**5.3.1** Connect the 22 V a.c. source to the J104 terminal on the underside of the SA-* plug-in chassis and with the VOM check the B+ and B— voltages at their respective test tip jacks on the plug-in module as diagrammed in Fig. 1.

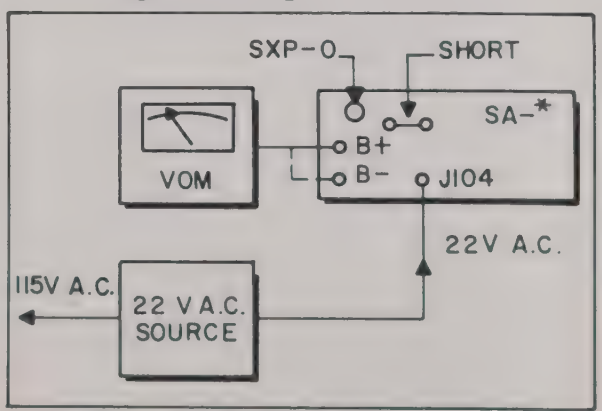



**Fig. 1 Test Setup for D.C. Voltage Test**

The meter should indicate 15 V within ±0.75 V. If the voltages measured are within tolerance, proceed with para. 5.4.

If the voltages are incorrect or absent, disconnect the VOM and the 22 V a.c. source from the SA-* and proceed as follows:

**5.3.2** Turn the plug-in module over and remove the four Phillips head screws holding the d.c. power supply sub-assembly to the plug-in chassis. Position the sub-assembly so that its circuitry is accessible; then *firmly connect* a temporary *grounding strap* between the plug-in chassis and the power supply sub-assembly (see Fig. 2).

**5.3.3** Reconnect the 22 V a.c. source to J104 and with the VOM measure the voltage at check point A as defined in Fig. 3.

At check point A the meter should indicate +15.3 ± 0.75 V d.c. If the voltage is incorrect, check capacitors C110, C111 and resistor R105; replace a faulty component if necessary, then check the voltage at the B+ tip jack.

**5.3.4** If the B+ voltage is still incorrect, measure the voltage at check point B; the meter should indicate +15.3 ± 0.8 V d.c. If the voltage is correct, transistor Q101 may be faulty; check by substitution and by measurement at the B+ tip jack.

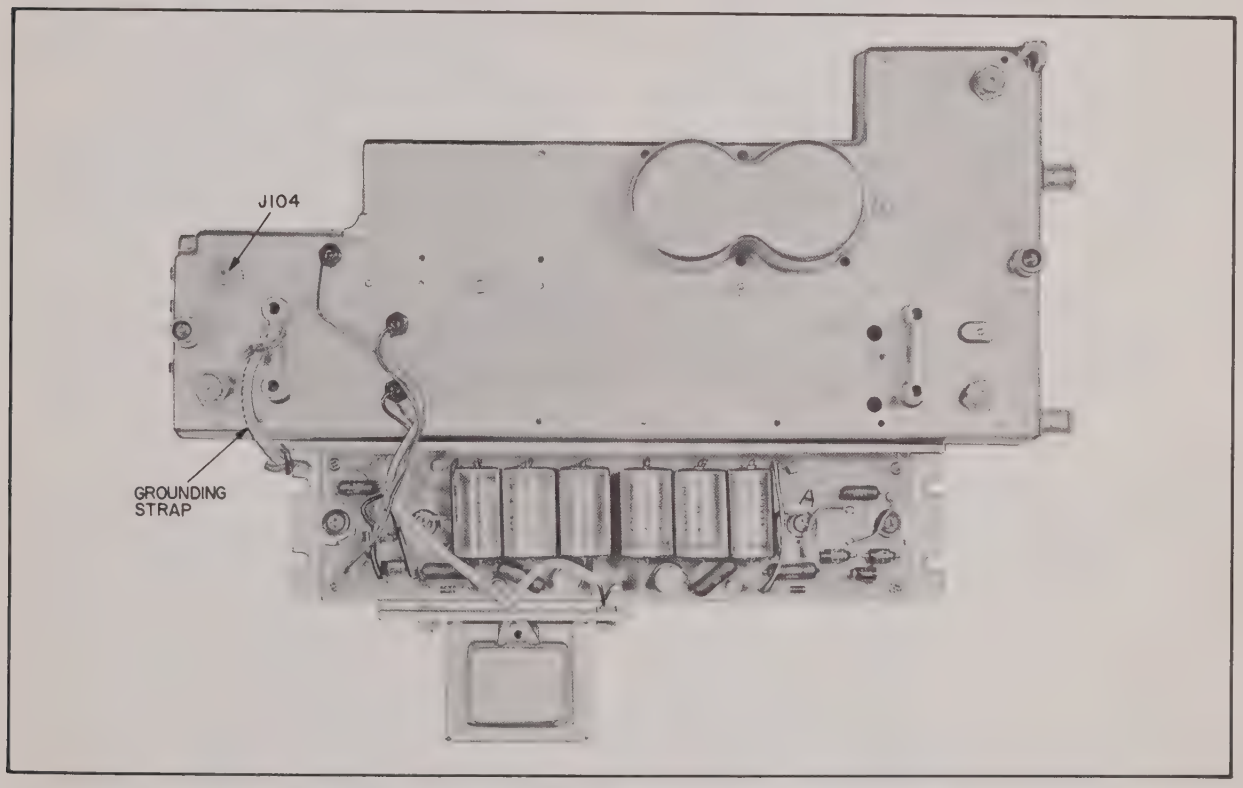



**Fig. 2 D.C. Power Supply Removed from Plug-in Chassis**

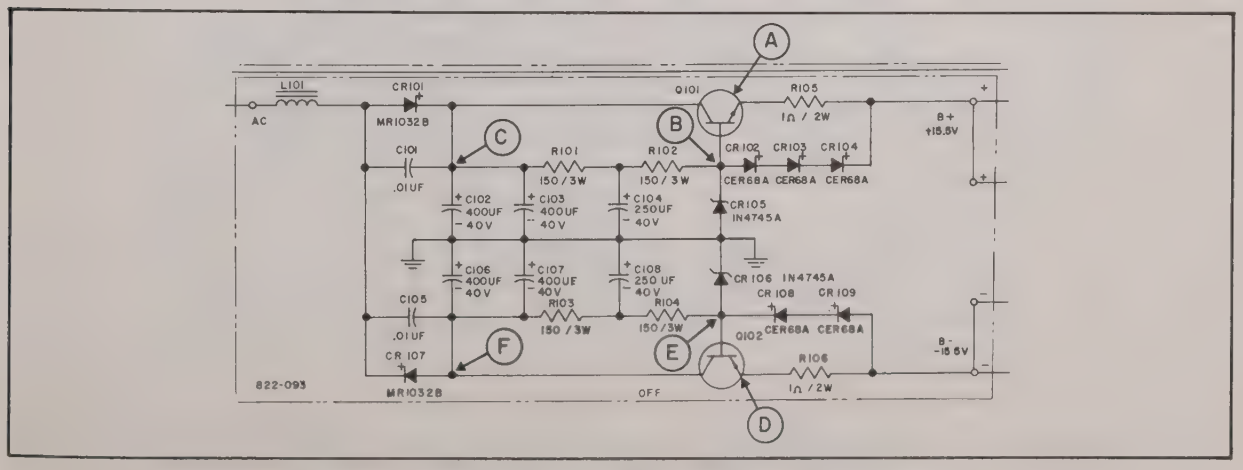



**Fig. 3 Check Points on D.C. Power Supply Circuit Board**

**5.3.5** If the voltage at check point B was incorrect, Zener diode CR105 may be faulty; substitute a new diode and again measure the voltage at check point B. If this voltage is still incorrect, measure the voltage at check point C. The meter should indicate +27 ± 1 V d.c. If the voltage is correct, resistors R101, R102 or capacitor C104 may be faulty; replace any faulty component. Again check the voltage at point C; if it is incorrect, check diode CR101 by substitution and again measure the voltage at check point C; alternatively capacitors C101, C102, C103, C109 or coils L101 or L102 may be faulty. Replace any faulty component, then check again for correct B+.

**5.3.6** If the B+ voltage is still incorrect, the trouble may originate in the B− supply section. Connect the VOM to check point D; the meter should indicate −15.3 ± 0.75 V d.c. If the voltage is incorrect, check capacitors C112, C113 and resistor R106. Replace any faulty component and recheck at point D. If the meter still indicates an incorrect voltage, check the voltage at point E. The meter should indicate −15.9 ± 0.8 V d.c. If the voltage is correct, transistor Q102 may be faulty; check by substitution and by measuring again the voltage at check point E. If the voltage is incorrect, substitute a new Zener diode for CR106 and again test the voltage at E.

**5.3.7** If the voltage at E is still incorrect, apply the VOM at check point F. The meter should indicate −27 ± 1 V d.c. If the voltage is correct, check resistors R103, R104 and capacitor C108; replace any faulty component. If the voltage at F is incorrect, substitute a new diode for CR107 and again check the voltage at F; alternatively check capacitors C105, C106 and C107; replace any faulty component. The B+ and B− voltages should now check out as specified.

**5.3.8** Disconnect the VOM from the power supply. Connect an oscilloscope, set to the a.c. 0.005 V per cm vertical range, between the B+ tip jack and chassis ground. Check for less than 15 mV p-p of a.c. ripple. If ripple is excessive, check capacitors C102, C103 and C104 for an open condition. Replace any faulty component and recheck for less than 15 mV p-p of a.c. ripple. Connect the oscilloscope between the B− tip jack and chassis ground. Again check for less than 15 mV p-p of a.c. ripple. If it is excessive, check capacitors C106, C107 and C108 for an open condition. Replace any faulty component and recheck for less than 15 mV p-p of a.c. ripple.

**5.3.9** Disconnect the oscilloscope and the 22 V a.c. source from the plug-in module, remove the temporary grounding strap and reconnect the d.c. power supply sub-assembly to the plug-in chassis.

**5.3.10** The SA-* should now be checked out for proper r-f operation. This can be done simply by applying an off-the-air signal or a pilot tone to the LINE IN terminal and monitoring the r-f output at the LINE OUT terminal with a field strength meter or, after appropriate attenuation, on a TV monitor set. Alternatively, a sweep test method can be employed, checking for specified amplifier gain, gain control range, tilt characteristics, AGC operation, and terminal match. The sweep frequency test setup given in Fig. 4 is basically the same for all circuit boards.

## 5.4 TRUNK LINE AMPLIFIER

**5.4.1** If the d.c. power supply was found to be operating properly, first check the trunk line amplifier circuitry (for Model SA-5AW see para. 5.7). Connect the plug-in module into the test setup as diagrammed in Fig. 4. This setup will permit testing the min. full gain, gain control range, frequency response and tilt control characteristics of the trunk line amplifier circuitry.

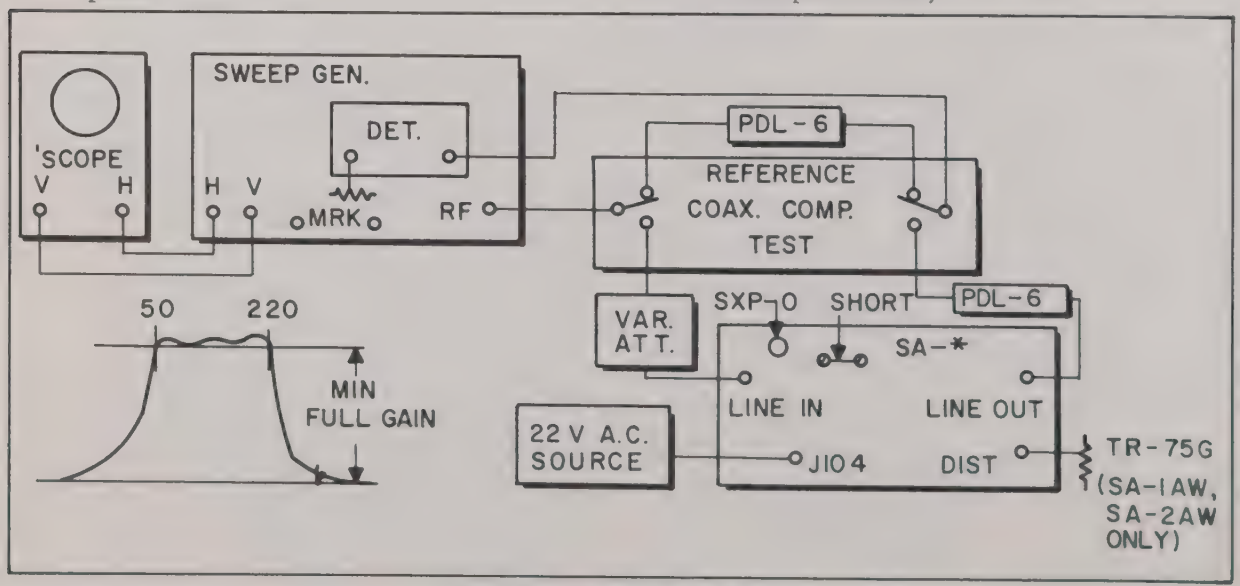



**Fig. 4 Sweep Test Setup**

**5.4.2** Energize the equipment and allow about 30 minutes for warm-up. Then set the sweep generator for sweeping over the 50 MHz to 220 MHz range. Set the marker generator controls on the sweep generator front panel for displaying 50 and 220 MHz markers. Set the sweep r-f output for a low level to avoid overloading the amplifier. On Models SA-1AW and SA-3AW set the MAN/AGC switch to the MAN position. Set the LINE GAIN control for maximum at the extreme counter-clockwise position (on Models SA-2AW, SA-4AW and SA-6AW max. gain is with the LINE GAIN control in extreme clockwise position).

**5.4.3** The minimum full gain characteristics specified for trunk line amplifiers are:
25 dB for Models SA-1AW and SA-2AW,
26 dB for Models SA-3AW, SA-4AW and SA-6AW.
The minimum full gain can be checked by inserting the relevant attenuation in the variable attenuator of the test setup. The amplifier response between the markers should still be above the reference trace.

**5.4.4** At the same time the flatness of the response can be examined; it should be within ±0.25 dB between the markers. Also check whether the LINE GAIN control range meets the specified minimum of 7 dB reduction from full gain by turning the control slowly clockwise (or counter-clockwise, depending on the Model) through its entire range. The LINE TILT control action can be checked in a similar manner for a 3.5 dB range.

**5.4.5** If the trunk line amplifier meets all the above tests, proceed with testing the AGC circuitry as given in para. 5.5 for Models SA-1AW and SA-3AW, or test the bridging amplifier circuitry as given in para. 5.6 for Models SA-1AW and SA-2AW.

**5.4.6** If the trunk line amplifier does not meet one or more of the above tests, the trouble lies in the trunk line amplifier circuitry itself; disconnect the plug-in module from the variable attenuator and the coaxial comparator, then proceed as described in para. 5.4.7.

**5.4.7** Remove the cover plate from the plug-in module. With the VOM check the voltages given and in the sequence of check points given for each stage (starting with Q301) in Table 2. On Models SA-1AW and SA-3AW the MAN/AGC switch should be in the MAN position.

**5.4.8** If you cannot obtain a voltage as specified in Table 2, replace the relevant transistor, then check the voltage again. If the voltage remains incorrect, check each passive component in the relevant transistor stage; replace the faulty component and check the voltage again. If you suspect Q303 or Q304, test the transistors with a transistor tester and replace the faulty one.

**5.4.9** After replacement of a faulty component, check the amplifier characteristics. A transistor replacement may require realignment of the trunk line amplifier circuitry; if that is the case, refer to the alignment procedure given in section 6.

## 5.5 AGC CIRCUIT

**5.5.1** Check the voltages given and in the sequence of check points given for each stage (starting with Q707) in Table 3. On Models SA-1AW and SA-3AW the MAN/AGC switch should be in the AGC position.

**TABLE 2. TRUNK LINE AMPLIFIER D.C. VOLTAGE CHECKS**

| STAGE | Q301 | Q302 | Q303 | Q304 | J305 | Q306 |
|---|---|---|---|---|---|---|
| EMITTER | −11.7 | −12.2 | * | * | + 2.0 | − 9.2 |
| BASE | −11.1 | −11.6 | * | +14.5 | + 2.6 | − 8.6 |
| COLLECTOR | +15.0 | + 1.0 | * | * | +15.0 | +15.0 |
| ACROSS R305 | 2.8±0.4 | ——— | ——— | ——— | ——— | ——— |
| ACROSS R310 | ——— | 2.8±0.4 | ——— | ——— | ——— | ——— |
| ACROSS R322 | ——— | ——— | ——— | ——— | ——— | 4.6±0.6 |

*Voltage varies with LINE GAIN control setting.

**TABLE 3. AGC CIRCUIT D.C. VOLTAGE CHECKS**

| STAGE | Q707 | Q706 | Q705 | Q704 | Q703 | Q702 | Q701 |
|---|---|---|---|---|---|---|---|
| EMITTER | −9.8 | −12.9 | −6.2 | * | * | +0.6 | +0.6 |
| BASE | −9.2 | −12.3 | −5.6 | * | * | * | +1.2 |
| COLLECTOR | 0 | ——— | 0 | * | * | * | * |

*Voltage varies with LINE GAIN control setting.

**5.5.2** If you cannot obtain a voltage as specified in Table 3, replace the relevant transistor, then check the voltage again. If the voltage remains incorrect, check each passive component in the relevant transistor stage; replace the faulty component and check the voltage again. If you suspect Q702, Q703 or Q704, test the transistors with a transistor tester and replace the faulty one.

**5.5.3** After replacement of a faulty component, check the amplifier characteristics. A transistor replacement may require realignment of the preselector circuitry; if that is the case, refer to the alignment procedure given in section 6.

### 5.6 BRIDGING AMPLIFIER

**5.6.1** Check the voltages given and in the sequence of check points given for each stage (starting with Q401) in Table 4. On Model SA-1AW the MAN/AGC switch should be in the MAN position.

**TABLE 4. BRIDGING AMPLIFIER D.C. VOLTAGE CHECKS**

| STAGE | Q401 | Q402 | Q403 | Q404 |
|---|---|---|---|---|
| EMITTER | −0.75 | −11.6 | + 1.6 | − 9.0 |
| BASE | −0.15 | −11.0 | + 2.2 | − 8.4 |
| COLLECTOR | +9.0 | + 1.0 | +15.0 | +15.0 |
| ACROSS R407 | 14±1.5 | ——— | ——— | ——— |
| ACROSS R415 | ——— | 2.8±0.4 | ——— | ——— |
| ACROSS R425 | ——— | ——— | ——— | 4.9±0.7 |

**5.6.2** If you cannot obtain a voltage as specified in Table 4, replace the relevant transistor, then check the voltage again. If the voltage remains incorrect, check each passive component in the relevant transistor stage; replace the faulty component, then check the voltage again.

**5.6.3** After replacement of a faulty component, check the amplifier characteristics. A transistor replacement may require realignment of the bridging amplifier circuitry; if that is the case, refer to the alignment procedure given in section 6.

### 5.7 INTERMEDIATE BRIDGING AMPLIFIER MODEL SA-5AW

**5.7.1** The amplifier characteristics of a Model SA-5AW can be examined in a test setup similar to the one given in Fig. 4, except that a simulator for 15 dB* of cable will have to be inserted ahead of the LINE IN terminal to satisfy the fixed equalizer circuit built into Model SA-5AW.

*Measured at 216 MHz; preferably use JT-1500 or air-dielectric type cable if a specially designed cable simulator is not available.

**5.7.2** The minimum full gain specified for this amplifier is 33 dB, with a gain control range of 7 dB down from maximum gain. When testing the amplifier, set the GAIN control R613 and the TILT control R615 to maximum.

**5.7.3** For stage-by-stage testing, check the voltages given for the emitter, base and collector in each stage and in the sequence given (starting with Q601) in Table 5. It is assumed that the passive equalizer network will not require servicing.

**TABLE 5. INTERMEDIATE BRIDGING AMPLIFIER, D.C. VOLTAGE CHECKS**

| STAGE | Q601 | Q602 | Q603 | Q604 | Q605 | Q606 |
|---|---|---|---|---|---|---|
| EMITTER | −13.5 | + 1.0 | −11.5 | −11.5 | + 1.1 | − 9.2 |
| BASE | −12.9 | + 1.6 | −10.9 | −10.9 | + 1.7 | − 8.6 |
| COLLECTOR | + 0.8 | +15.0 | +15.0 | + 1.9 | +15.0 | +15.0 |

**5.7.4** If you cannot obtain a voltage as specified in Table 5, replace the relevant transistor, then check the voltage again. If the voltage remains incorrect, check each passive component in the relevant transistor stage; replace the faulty component and check the voltage again.

**5.7.5** After replacement of a faulty component, check the amplifier characteristics. Replacement of a transistor may require realignment of the amplifier circuitry; if that is the case, refer to the alignment procedure given in section 6.

### 5.8 RE-ASSEMBLY

**5.8.1** If it was necessary to remove a printed circuit board from the plug-in chassis in order to effect a repair, first be sure that the board is properly replaced in the chassis; look for complete compression of the split-ring washers under the hold-down screws on the circuit board. Negligent mounting may result in intermittent or no ground.

**5.8.2** If no realignment is required, replace the cover on the plug-in module, then tag the module to indicate that it has been repaired and is ready for service.

## 6.0 ALIGNMENT

### 6.1 GENERAL

The alignment procedures given here deal first with the trunk line amplifier circuitry as found in all plug-in modules except in a Model SA-5AW. No other circuit board should be re-aligned before first checking the alignment of the trunk line amplifier circuitry. All plug-in modules must be equipped with an SXP-0 pad. On all but the SA-5AW, equalizer mounting terminals E5 and E6 must be connected by a shorting strap.

## 6.2 TEST INSTRUMENTS

In addition to the instruments listed in the trouble-shooting procedure, a return loss bridge Jerrold Model RLB-H-7F will have to be available where terminal impedance match has to be checked or adjusted, and a 73.5 MHz generator such as Jerrold Model CCG-73.5 or TCG-73.5 for alignment of the AGC board.

## 6.3 TRUNK LINE AMPLIFIER—MODELS SA-1AW, 2AW, 3AW, 4AW, AND 6AW

### 6.3.1 FREQUENCY RESPONSE AND GAIN

a. Connect the test equipment as shown in Fig. 5 for all the above Models except SA-6AW, where the DIST. OUT terminal is used instead of the LINE OUT terminal; allow the equipment to warm up.

b. On Models SA-1AW and 3AW, set the AGC switch to the MAN. position.

c. Adjust the sweep generator to sweep from 40 MHz to 230 MHz, insert markers at 50 MHz and 220 MHz, and set the variable attenuator for 25 dB.

CAUTION:

Do not overdrive the amplifier with excessive sweep input!

d. Obtain test and reference traces on the oscilloscope, then superimpose them at 220 MHz by adjusting the LINE GAIN control.

e. Adjust the LINE TILT control to superimpose the traces at 50 MHz and, if necessary, tune C323 to obtain a response similar to that of curve "A" in Fig. 5.

NOTE:

If trimmer C322 or C323 require tuning, the cover of the plug-in module should be temporarily removed. After tuning, the cover must be replaced to check frequency response; slight retuning may be necessary.

f. Set the LINE TILT control fully counter-clockwise and, if necessary, tune C322 so that the resonant peak appears above 220 MHz as shown in curve "B" of Fig. 5.

g. Readjust the LINE TILT control to obtain a response similar to curve "A". The response should now be flat within ±0.25 dB from 50 MHz to 220 MHz.

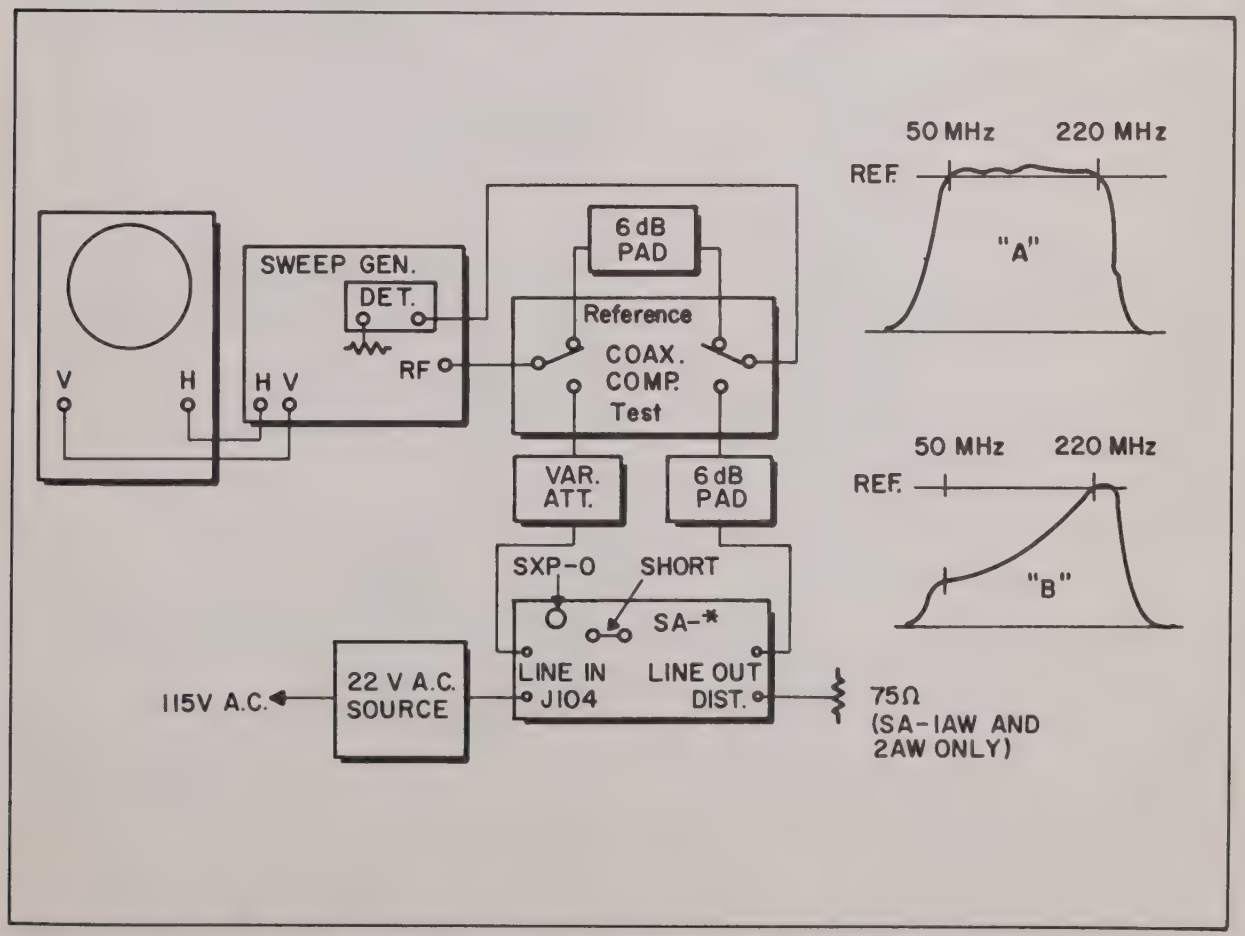



**Fig. 5 Frequency Response and Gain Test Setup and Response Curves**

h. Disconnect the test equipment but do not disturb the test instrument settings.

### 6.3.2 LINE IN TERMINAL MINUMUM RETURN LOSS

a. Connect the test equipment as shown in Fig. 6 and set the variable attenuator for 28.5 dB.

b. Obtain test and reference traces on the oscilloscope.

c. If necessary, tune C201 on the Equalizer Adapter board to obtain a response curve similar to that in Fig. 6.

d. Adjust the variable attenuator so that all points of the match trace are below the reference trace.

e. Subtract 12.5 dB from the variable attenuator setting, the remainder equals minimum return loss; it should be at least 16 dB.

f. Leave the test setup intact and proceed with 6.3.3.

### 6.3.3 LINE OUT TERMINAL MINIMUM RETURN LOSS

a. Disconnect the 75 Ω termination from the LINE OUT terminal or from the DIST. OUT terminal of a Model SA-6AW, and disconnect the r-f bridge from the LINE IN terminal.

b. Terminate the LINE IN terminal in 75 Ω and connect the r-f bridge to theLINE OUT terminal of all Models except SA-6AW, where the bridge is to be connected to the DIST. OUT terminal.

c. Obtain test and reference traces on the oscilloscope.

d. If adjustment is necessary to obtain a response curve similar to that in Fig. 6, proceed as follows:

1. On Models SA-1AW and 2AW, tune C401 and C421 of the Bridging Amplifier board.
2. On Models SA-3AW and 4AW, tune C10 and C12 of the Trunk Line Amplifier board.
3. On Model SA-6AW, tune C10 of the Trunk Line Amplifier board.

e. Adjust the variable attenuator so that all points of the match trace are below the reference trace.

f. Subtract 12.5 dB from the variable attenuator setting, the remainder equals minimum return loss; it should be at least 16 dB.

g. Disconnect the test equipment but do not disturb the test instrument settings.

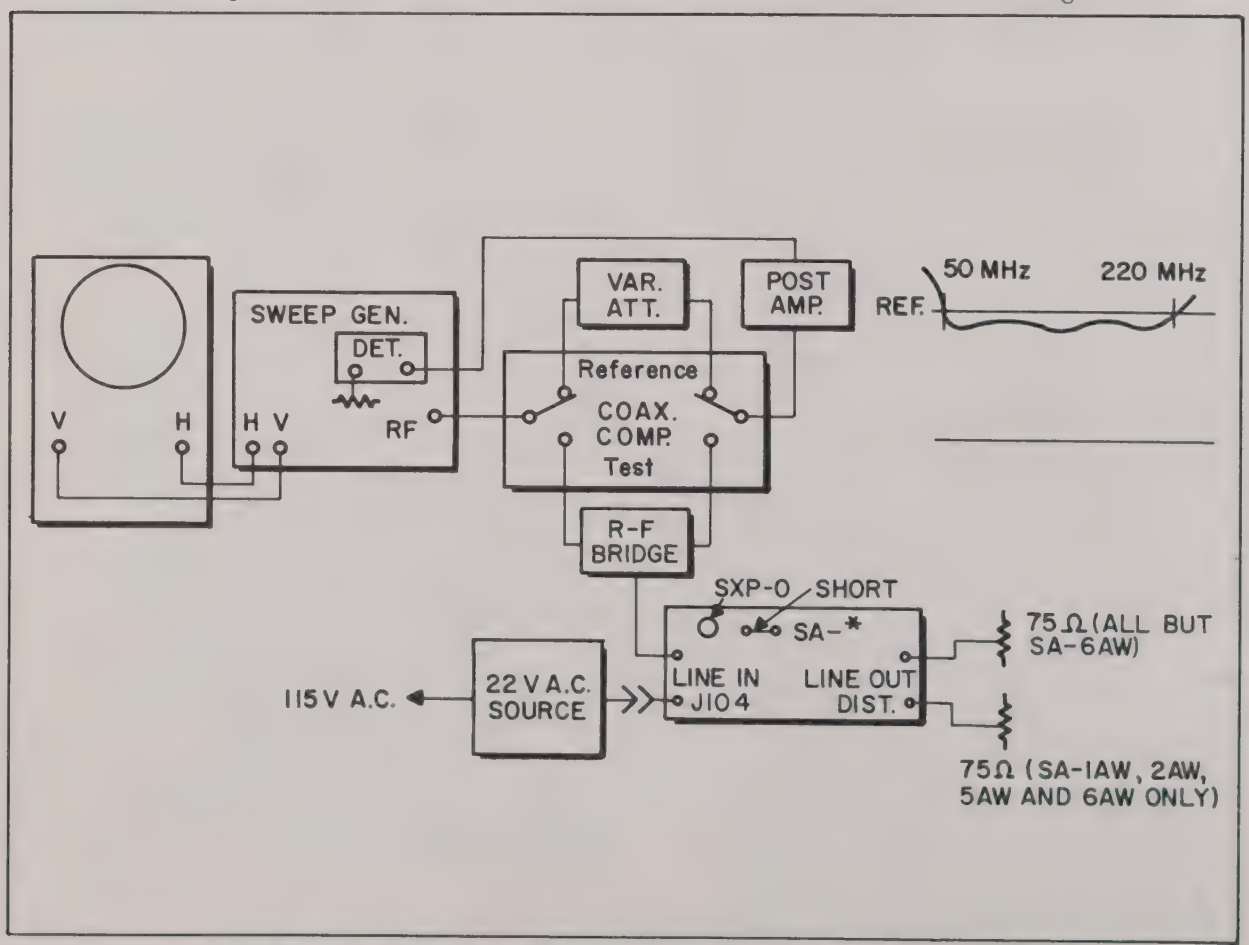



**Fig. 6 Minimum Return Loss Test Setup and Response Curve**

## 6.4 BRIDGING AMPLIFIER—MODELS SA-1AW AND 2AW

### 6.4.1 FREQUENCY RESPONSE AND GAIN

a. Connect the test equipment as shown in Fig. 5, but reverse the connections between the LINE OUT and DIST. OUT terminals so that LINE OUT is terminated in 75 Ω and DIST. OUT provides the test leg output signals.

CAUTION:

Do not overdrive the amplifiers with excessive sweep input!

b. Set the DIST. GAIN control fully clockwise, then set the variable attenuator for 44 dB and obtain test and reference traces on the oscilloscope.

c. Adjust the variable attenuator to superimpose the traces at 220 MHz, then adjust the DIST. TILT control to flatten the response from 50 MHz to 220 MHz.

d. Subtract 25 dB from the variable attenuator setting, the remainder equals minimum full gain of the Bridging Amplifier; it should be at least 19 dB but not more than 21 dB.

e. Readjust the variable attenuator to 44 dB and adjust the DIST. GAIN control to superimpose the test and reference traces at 220 MHz, then adjust the DIST. TILT control so that the response is flat within ±0.5 dB from 50 MHz to 220 MHz.

f. Disconnect the test equipment but do not disturb the test instrument settings.

### 6.4.2 DIST. OUT TERMINAL MINIMUM RETURN LOSS

a. Connect the test equipment as shown in Fig. 6, but connect the r-f bridge to the DIST. OUT terminal and terminate the LINE OUT terminal in 75 Ω.

NOTE:

On Model SA-1AW, the AGC switch should be in the MAN. position.

b. Set the variable attenuator for 28.5 dB and obtain test and reference traces on the oscilloscope.

c. If necessary, tune C33 of the Bridging Amplifier board to obtain a response curve similar to that in Fig. 6.

d. Adjust the variable attenuator so that all points of the match trace are below the reference trace.

e. Subtract 12.5 dB from the variable attenuator setting, the remainder equals minimum return loss; it should be at least 16 dB.

f. Disconnect the test equipment.

## 6.5 AUTOMATIC GAIN CONTROL—MODELS SA-1AW AND 3AW

### 6.5.1 AGC CARRIER ATTENUATION AND RANGE

a. Connect the test equipment as shown in Fig. 7, set the AGC switch to the AGC position, and adjust the LINE GAIN control fully clockwise for minimum gain.

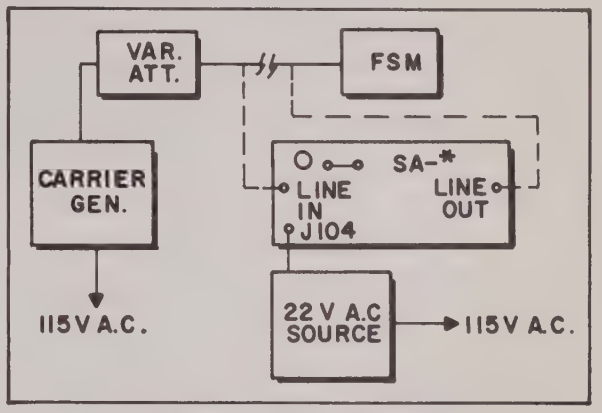



**Fig. 7 AGC Test Setup**

b. Tune the FSM to 73.5 MHz, and set the variable attenuator for an FSM indication of −14 dBmV.

c. Disconnect the FSM from the variable attenuator, then connect the attenuator to the LINE IN terminal and the FSM to the LINE OUT terminal.

d. Adjust L709 and L710 of the AGC board for a null indication on the FSM.

e. Set the LINE GAIN control fully counter-clockwise and adjust the variable attenuator for an indication of 22 dBmV on the FSM, then readjust the LINE GAIN control for an FSM indication of 17 dBmV; note the attenuator setting in dB.

f. Observe the FSM for a change of less than 0.5 dBmV while adjusting the variable attenuator plus 5 dB and minus 3 dB from the setting noted in step "e".

g. Disconnect the test equipment.

## 6.6 INTERMEDIATE BRIDGING AMPLIFIER—MODEL SA-5AW

### 6.6.1 FREQUENCY RESPONSE AND GAIN

a. Connect the test equipment as shown in Fig. 5 with the following changes:

1. Connect 15 dB of cable (measured at 216 MHz) between the variable attenuator and the LINE IN terminal.
2. Terminate the LINE OUT terminal in 75 Ω.
3. Connect the test leg 6-dB pad output lead to the DIST. OUT terminal.

b. Adjust the sweep generator to sweep from 40 MHz to 230 MHz, insert markers at 50 MHz

and 220 MHz, and set the variable attenuator for 18 dB.

CAUTION:

Do not overdrive the amplifier with excessive sweep input!

c. Obtain test and reference traces on the oscilloscope, then superimpose them at 220 MHz by adjusting the DIST. GAIN control.

d. Adjust the LINE TILT control to superimpose the traces at 50 MHz and, if necessary, tune C601 to obtain a response similar to curve "A"; response should now be flat within ±0.5 dB from 50 MHz to 220 MHz.

e. Disconnect the test equipment but do not disturb the test instrument settings.

### 6.6.2 LINE IN TERMINAL MINIMUM RETURN LOSS

a. Connect the test equipment as shown in Fig. 6, set the variable attenuator for 30.5 dB, and disconnect the 30 V a.c. source from terminal J104.

b. Obtain test and reference traces on the oscilloscope, then superimpose their markers by adjusting the variable attenuator.

c. If necessary, tune C501 on the Equalizer board to obtain a response curve similar to that in Fig. 6.

d. Readjust the variable attenuator to superimpose the markers of the test and reference traces.

e. Subtract 12.5 dB from the variable attenuator setting, the remainder equals minimum return loss; it should be at least 18 dB.

f. Leave the test setup intact and proceed with 6.6.3.

### 6.6.3 LINE OUT TERMINAL MINIMUM RETURN LOSS

a. Disconnect the 75 Ω termination from the LINE OUT terminal and the r-f bridge from the LINE IN terminal.

b. Terminate the LINE IN terminal in 75 Ω and connect the r-f bridge to the LINE OUT terminal.

c. The oscilloscope presentation should be identical to that observed in step "d" of 6.6.2.

d. Leave the test setup intact and proceed with 6.6.4.

### 6.6.4 DIST. OUT TERMINAL MINIMUM RETURN LOSS

a. Disconnect the 75 Ω termination from the DIST. OUT terminal and the r-f bridge from the LINE OUT terminal.

b. Terminate the LINE OUT terminal in 75 Ω and connect the r-f bridge to the DIST. OUT terminal, then apply a.c. power to the module.

c. Set the variable attenuator for 28.5 dB and obtain test and reference traces on the oscilloscope.

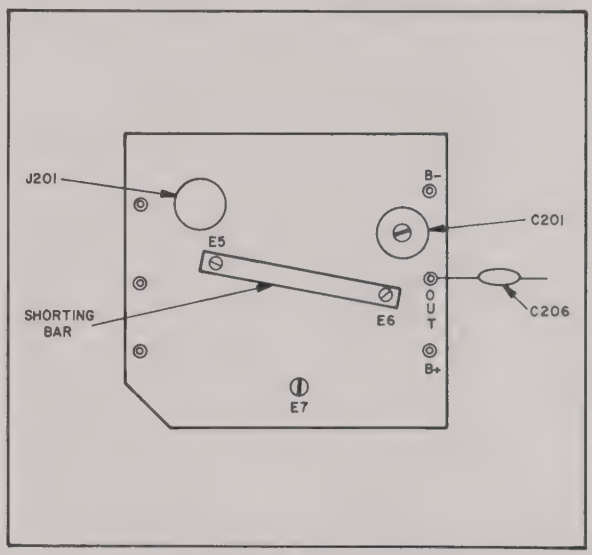
d. If necessary, tune C630 to obtain a response curve similar to that in Fig. 6.

e. Adjust the variable attenuator to superimpose the markers of the test and reference traces.

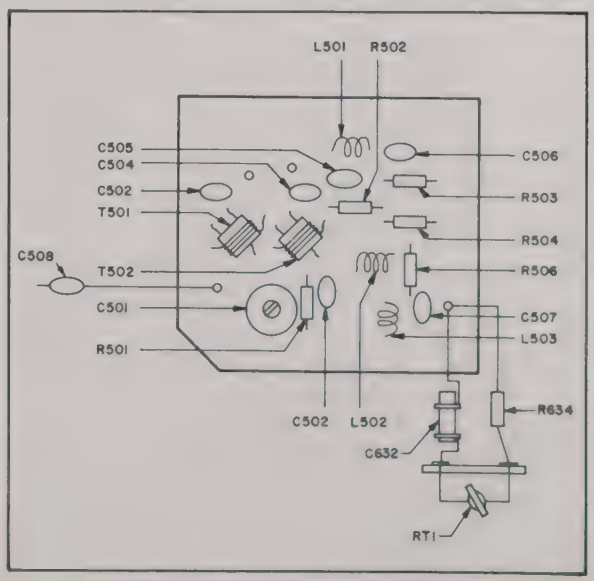
f. Subtract 12.5 dB from the variable attenuator setting, the remainder equals minimum return loss; it should be at least 16 dB.

g. Disconnect the test equipment.

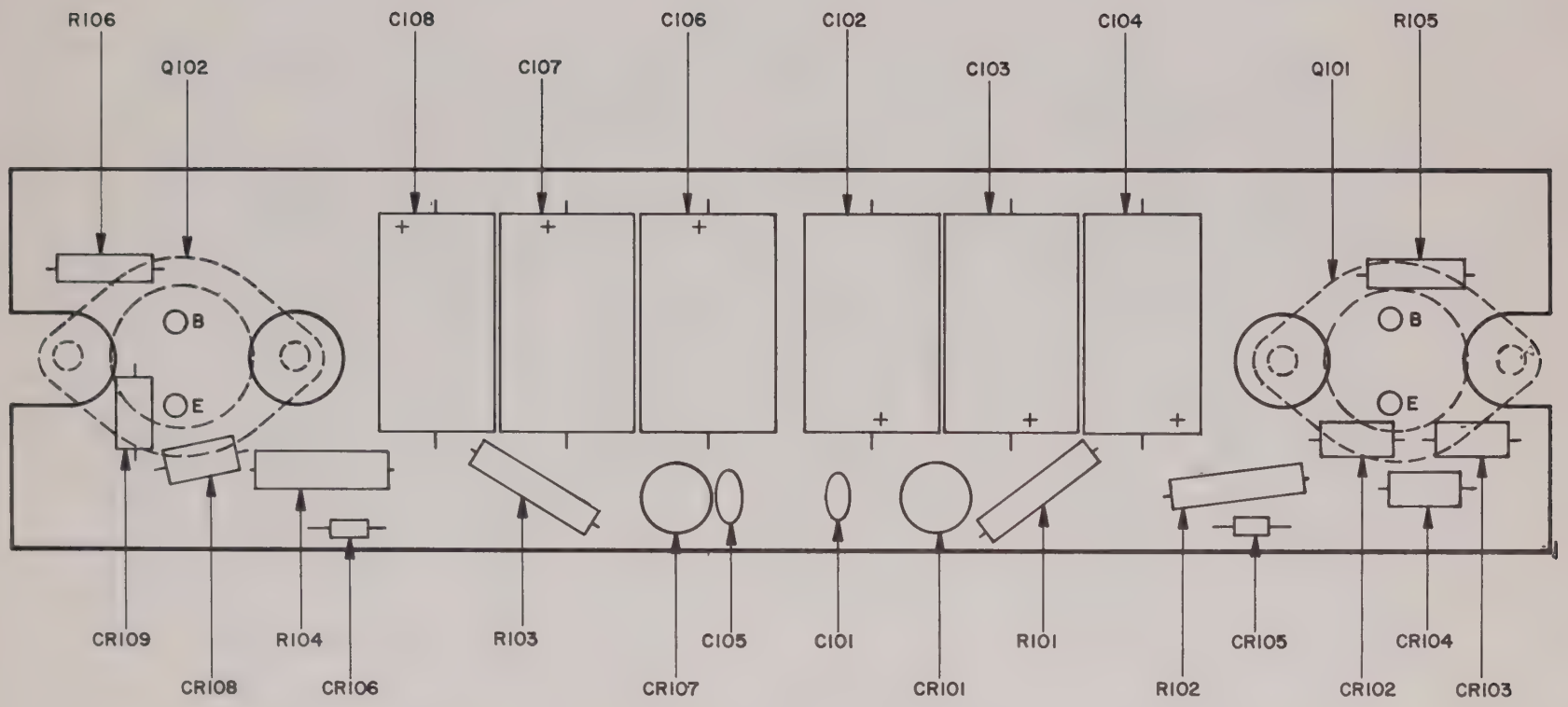
h. Replace the cover on the plug-in module, then tag the module to indicate that it is ready for service.



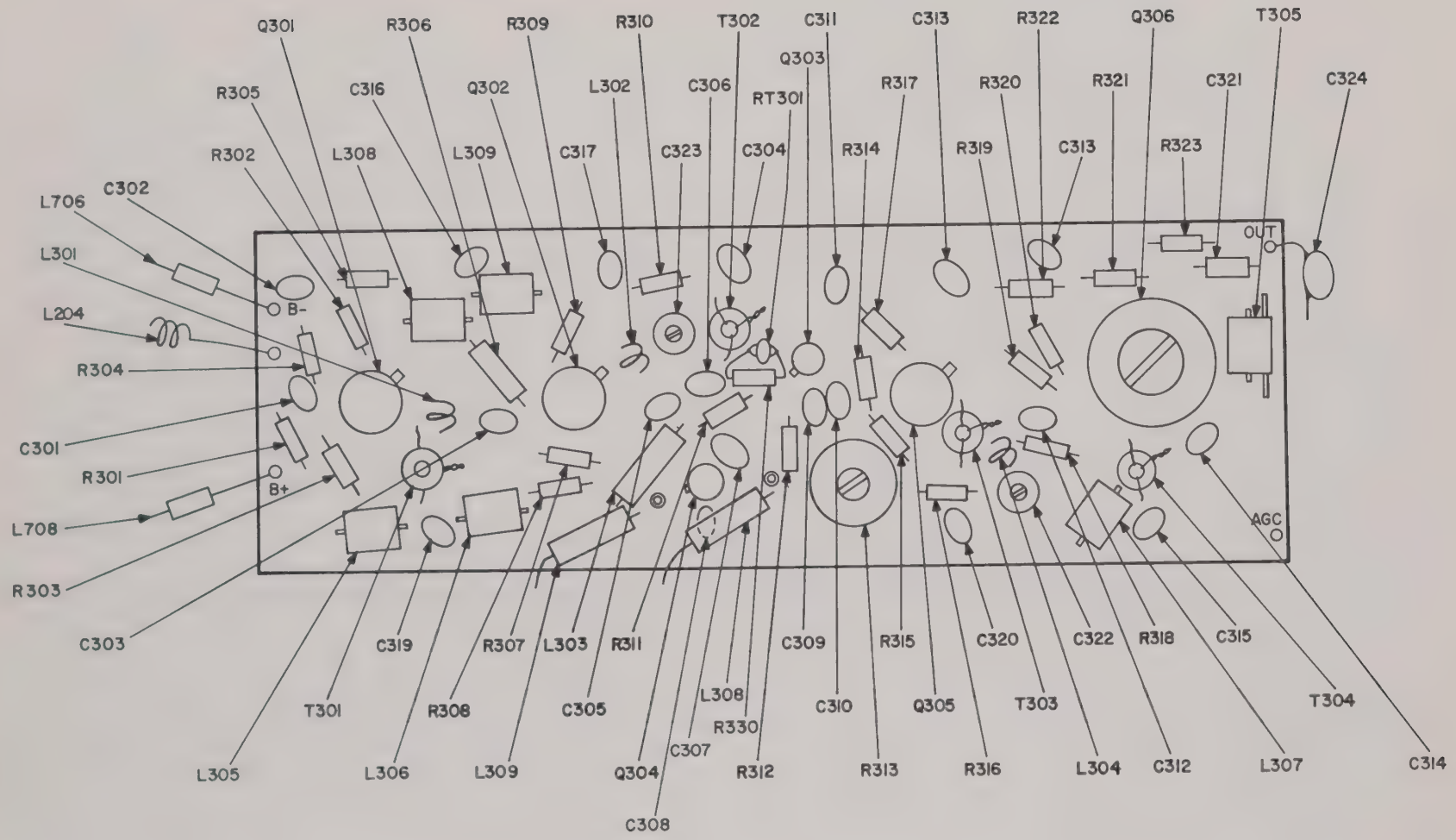

**Equalizer Adapter Board—Component Location Diagram**



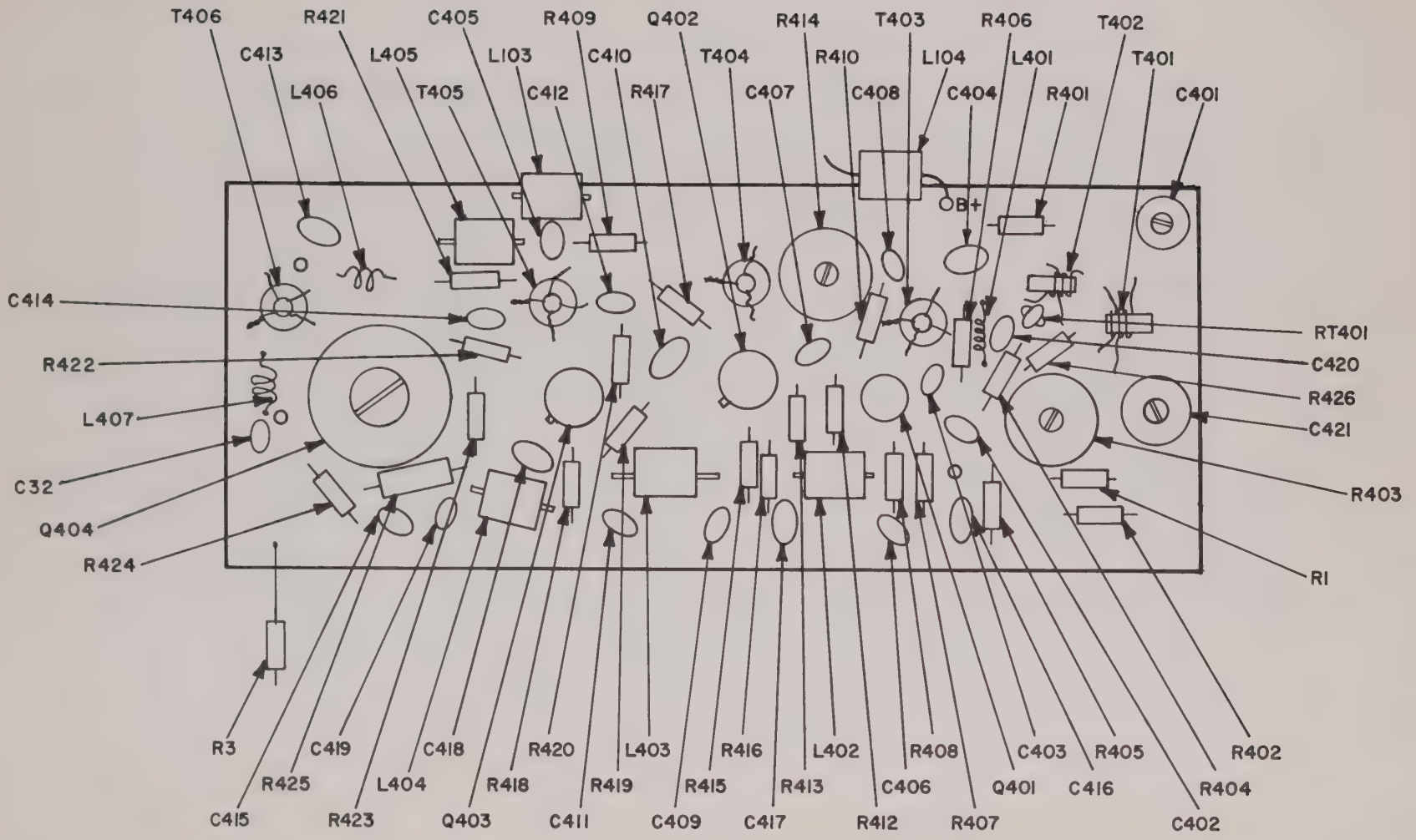

**Equalizer Board—Component Location Diagram—Model SA-5AW Only**



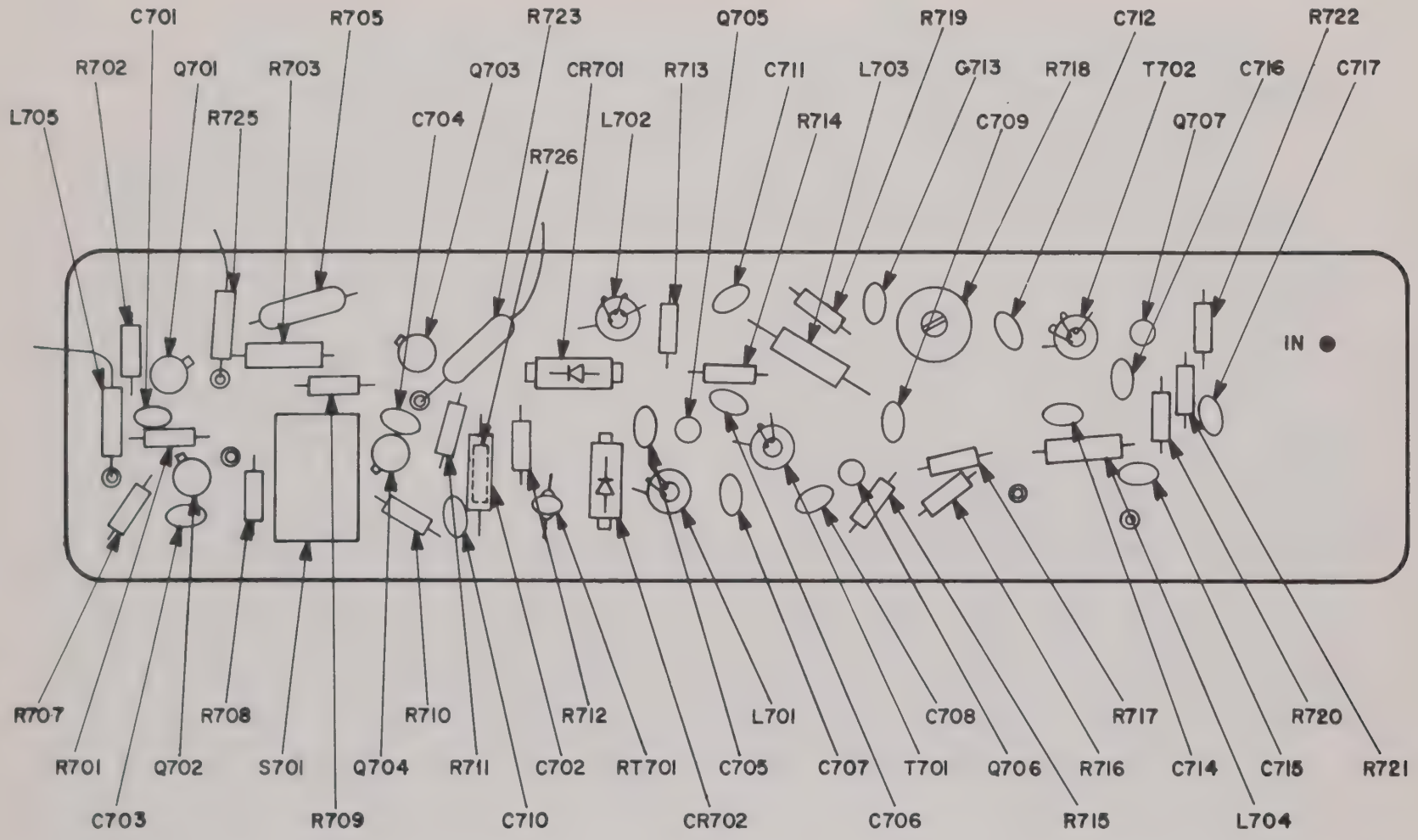

**D.C. Power Supply—Component Location Diagram**
**All Models SA-*AW**



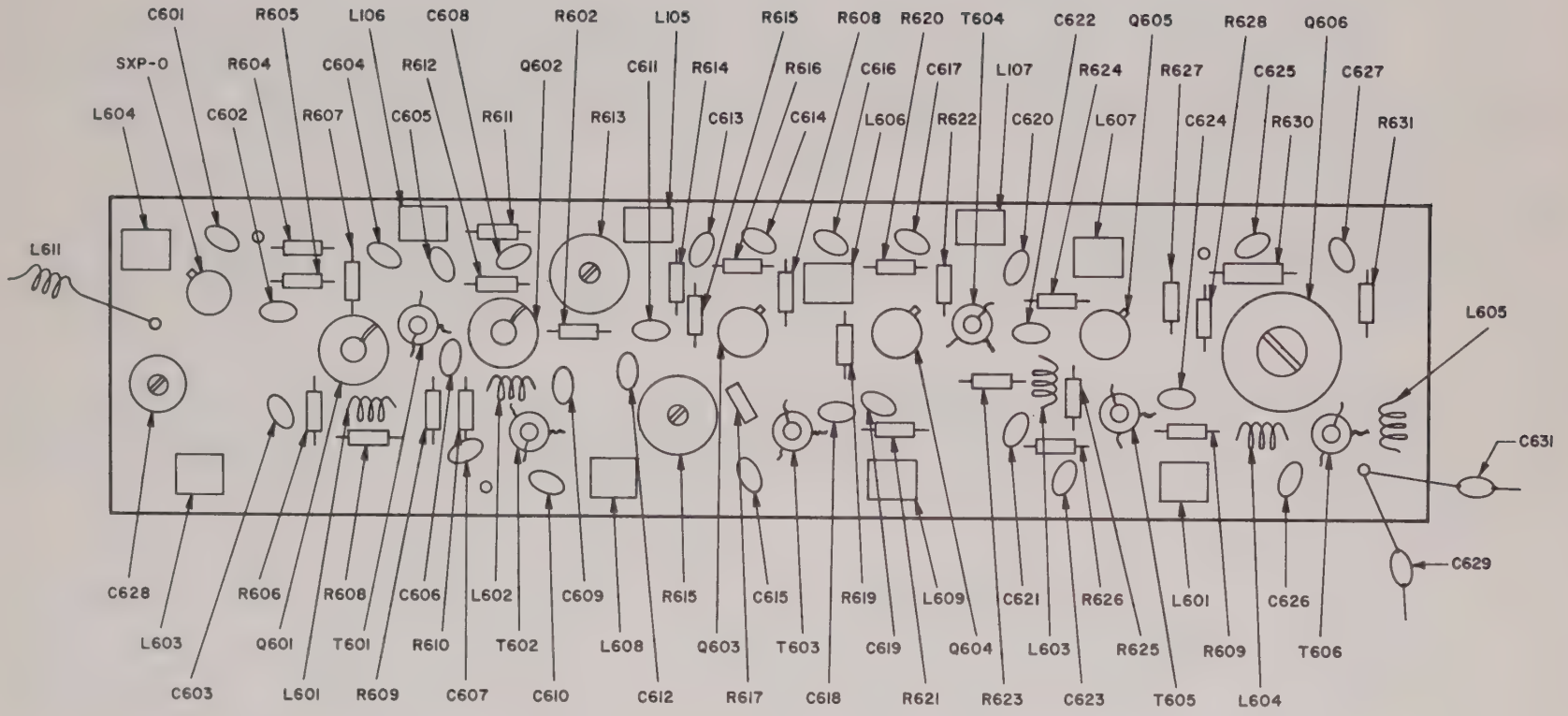

**Trunkline Amplifier Circuit Board—Component Location Diagram**
**Models SA-1AW, SA-2AW, SA-3AW, SA-4AW, and SA-6AW**




**Bridging Amplifier Circuit Board—Component Location Diagram**
**Models SA-1AW, SA-2AW**




AGC Circuit Board—Component Location Diagram
Models SA-1AW, SA-3AW




**Intermediate Bridging Amplifier Circuit Board—Component Location Diagram**
**Model SA-5AW**

## MODELS SA-1AW AND SA-2AW

ASSEMBLY: BRIDGING AMPLIFIER P/C BOARD — REF. DWG. NO.: E861-830, 838

| ITEM | SCHEMATIC DESIGNATION | QTY. | DESCRIPTION | JERROLD PART NO. |
|---|---|---|---|---|
| | | | CAPACITORS | |
| 1 | C401, 421 | 2 | 2 to 8 pF, trimmer | 128-546 |
| 2 | C402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419 | 18 | 0.02 μF, 25 V | 124-078 |
| 3 | C420 | 1 | 30 pF, 5%, disc | 124-121 |
| | | | RESISTORS | |
| 4 | R401, 410 | 2 | 75 Ω, ¼ W, 5% | 124-954 |
| 5 | R402, 404 | 2 | 39 Ω, ¼ W, 5% | 112-983 |
| 6 | R403, 414 | 2 | 500 Ω, 20%, potentiometer | 118-141 |
| 7 | R405 | 1 | 2 kΩ, ¼ W, 5% | 112-930 |
| 8 | R406 | 1 | 150 Ω, ¼ W, 5% | 112-974 |
| 9 | R407, 423 | 2 | 1.3 kΩ, ¼ W, 5% | 112-064 |
| 10 | R408 | 1 | 24 Ω, ¼ W, 5% | 112-985 |
| 11 | R409 | 1 | 560 Ω, ¼ W, 5% | 112-104 |
| 12 | R412 | 1 | 1.8 kΩ, ¼ W, 5% | 112-972 |
| 13 | R413 | 1 | 750 Ω, ¼ W, 5% | 112-917 |
| 14 | R415 | 1 | 16 Ω, ¼ W, 5% | 112-081 |
| 15 | R416 | 1 | 68 Ω, ¼ W, 5% | 112-916 |
| 16 | R417, 421 | 2 | 270 Ω, ¼ W, 5% | 112-993 |
| 17 | R418 | 1 | 15 Ω, ¼ W, 5% | 112-973 |
| 18 | R419 | 1 | 3.9 kΩ, ¼ W, 5% | 112-979 |
| 19 | R420 | 1 | 2.4 kΩ, ¼ W, 5% | 112-918 |
| 20 | R422 | 1 | 1.6 kΩ, ¼ W, 5% | 112-012 |
| 21 | R424 | 1 | 22 Ω, ¼ W, 5% | 112-971 |
| 22 | R425 | 1 | 110 Ω, ¼ W, 5% | 111-242 |
| 23 | R426 | 1 | 36 Ω, ¼ W, 5% | 112-978 |
| | | | THERMISTOR | |
| 24 | RT401 | 1 | 30Ω, 10% @ 25° C | 110-140 |
| | | | TRANSISTORS | |
| 25 | Q401 | 1 | A490 | 130-152 |
| 26 | Q402, 403 | 2 | Factory selected | S130-174-1 |
| 27 | Q404 | 1 | Factory selected | S130-150-1 |

## MODEL SA-2AW

ASSEMBLY: PLUG-IN CHASSIS — REF. DWG. NO.: E861-830

| ITEM | SCHEMATIC DESIGNATION | QTY. | DESCRIPTION | JERROLD PART NO. |
|---|---|---|---|---|
| | | | CAPACITORS | |
| 1 | C32, 206 | 2 | 0.02 μF, 25 V, lead of C206 forms air-coil L204 | 124-078 |
| 2 | C33, 421 | 2 | 2 to 8 pF, trimmer | 128-546 |
| 3 | C109, 110, 111, 112, 113 | 5 | 1000 pF, 20%, feed-thru | 129-110 |
| 4 | C324 | 1 | 160 pF, 500 V, 5% | 126-123 |
| 5 | C730, 731 | 2 | 470 pF, 10%, feed-thru | 126-152 |
| | | | CHOKES | |
| 6 | L102 | 1 | Filament | 157-005 |
| 7 | L308, 309 | 2 | 27 μH | 157-052 |
| | | | CONNECTORS | |
| 8 | J101, 102, 103 104, TP101, 102, 103 | 7 | G-61, without hardware | 821-195 |
| 9 | TP104 | 1 | Tip jack, red | 185-133 |
| 10 | TP105 | 1 | Tip jack, violet | 185-134 |
| 11 | TP106 | 1 | Tip jack, grey | 185-135 |
| | | | RESISTORS | |
| 12 | R1 | 1 | 3.9 Ω, ¼ W, 5% | 122-067 |
| 13 | R3 | 1 | 82 Ω, ¼ W, 5% | 112-090 |
| 14 | R324, 328 | 2 | Factory selected | |
| 15 | R325 | 1 | 470 Ω, 1 W, 10% | 112-321 |
| 16 | R326A, 326B | 1 | 25 kΩ, 10%, dual potentiometer | B118-171 |
| 17 | R327 | 1 | 1.2 kΩ, 1 W, 10% | 112-375 |

## MODELS SA-1AW, SA-2AW, SA-3AW, SA-4AW, AND SA-6AW

ASSEMBLY: EQUALIZER ADAPTER BOARD, MODEL EA — REF. DWG. NO.: E861-830, 838, 840, 842, 859

| ITEM | SCHEMATIC DESIGNATION | QTY. | DESCRIPTION | JERROLD PART NO. |
|---|---|---|---|---|
| | | | CAPACITOR | |
| 1 | C201 | 1 | 2 to 8 pF, trimmer | 128-564 |
| | | | SOCKET | |
| 2 | J201 | 1 | Transistor (for SXP-*) | 182-133 |

## MODEL SA-1AW

ASSEMBLY: PLUG-IN CHASSIS — REF. DWG. NO.: E861-838

| ITEM | SCHEMATIC DESIGNATION | QTY. | DESCRIPTION | JERROLD PART NO. |
|---|---|---|---|---|
| | | | CAPACITORS | |
| 1 | C32, 206 | 2 | 0.02 μF, 25 V, lead of C206 forms air-coil L204 | 124-078 |
| 2 | C33, 421 | 2 | 2 to 8 pF, trimmer | 128-546 |
| 3 | C109, 110, 111, 112, 113 | 5 | 1000 pF, 20%, feed-thru | 129-110 |
| 4 | C324 | 1 | 160 pF, 500 V, 5% | 126-123 |
| 5 | C718 | 1 | 13 pF, 10%, QC includes air-coil L711 | 122-039 |
| 6 | C719, 720, 730, 731 | 4 | 470 pF, 10%, feed-thru | 129-152 |
| | | | CHOKES | |
| 7 | L102 | 1 | Filament | 157-005 |
| 8 | L308, 309, 705, 706, 707, 708 | 6 | 27 μH | 157-052 |
| | | | CONNECTORS | |
| 9 | J101, 102, 103, 104, TP101, 102, 103 | 7 | G-61, without hardware | 821-195 |
| 10 | TP104 | 1 | Tip jack, red | 185-133 |
| 11 | TP105 | 1 | Tip jack, violet | 185-134 |
| 12 | TP106 | 1 | Tip jack, grey | 185-135 |
| | | | RESISTORS | |
| 13 | R1 | 1 | 3.9 Ω, ¼ W, 5% | 112-067 |
| 14 | R3 | 1 | 82 Ω, ¼ W, 5% | 112-090 |
| 15 | R723 | 1 | 330 Ω, 1 W, 5% | 112-120 |
| 16 | R725 | 1 | 1 kΩ, ¼ W, 5% | 112-927 |

## MODEL SA-5AW

ASSEMBLY: PLUG-IN CHASSIS — REF. DWG. NO.: E861-828

| ITEM | SCHEMATIC DESIGNATION | QTY. | DESCRIPTION | JERROLD PART NO. |
|---|---|---|---|---|
| | | | CAPACITORS | |
| 1 | C109, 110, 111 | 3 | 1000 pF, 20%, feed-thru | 129-110 |
| 2 | C508 | 1 | 1000 pF, GMV | 123-115 |
| 3 | C630 | 1 | 0.9 to 7 pF, trimmer | 128-530 |
| 4 | C632 | 1 | 18 pF, 600 V, 2% | 121-046 |
| 5 | C629, 631 | 2 | 0.02 μF, 25 V | 124-078 |
| | | | CHOKES | |
| 6 | L102 | 1 | Filament | 157-005 |
| 7 | L612 | 1 | 3.9 μH | 157-019 |
| | | | CONNECTORS | |
| 8 | J101, 102, 103, 104, TP102, 103 | 6 | G-61, without hardware | 821-195 |
| 9 | TP104 | 1 | Tip jack, red | 185-133 |
| 10 | TP105 | 1 | Tip jack, violet | 185-134 |
| 11 | TP106 | 1 | Tip jack, grey | 185-135 |
| | | | RESISTOR | |
| 12 | R634 | 1 | 36 Ω, ¼ W, 5% | 112-978 |
| | | | THERMISTOR | |
| 13 | RT1 | 1 | 30 Ω, 10%, @ 25° C | 110-140 |

## MODEL SA-3AW

ASSEMBLY: PLUG-IN CHASSIS — REF. DWG. NO.: E861-842

| ITEM | SCHEMATIC DESIGNATION | QTY. | DESCRIPTION | JERROLD PART NO. |
|---|---|---|---|---|
| | | | CAPACITORS | |
| 1 | C10, 12 | 2 | 0.9 to 7 pF, trimmer | 128-530 |
| 2 | C109, 110, 111 | 3 | 1000 pF, 20%, feed-thru | 129-110 |
| 3 | C206 | 1 | 0.02 μF, 25 V, lead forms air-coil L204 | 124-078 |
| 4 | C718 | 1 | 13 pF, 10%, QC, includes air-coil L711 | 112-039 |
| 5 | C719, 720, 730, 731 | 4 | 470 pF, 10%, feed-thru | 129-152 |
| | | | CHOKES | |
| 6 | L102 | 1 | Filament | 157-005 |
| 7 | L308, 309, 705, 706, 707, 708 | 6 | 27 μH | 157-052 |
| | | | CONNECTORS | |
| 8 | J101, 102, 104, TP101, 102 | 5 | G-61, without hardware | 821-195 |
| 9 | TP104 | 1 | Tip jack, red | 185-133 |
| 10 | TP105 | 1 | Tip jack, violet | 185-134 |
| 11 | TP106 | 1 | Tip jack, grey | 185-135 |
| | | | RESISTORS | |
| 12 | R723 | 1 | 330 Ω, 1 W, 5% | 110-120 |
| 13 | R725 | 1 | 1.1 kΩ, ¼ W, 5% | 112-927 |

## MODEL SA-4AW

ASSEMBLY: PLUG-IN CHASSIS — REF. DWG. NO.: E861-840

| ITEM | SCHEMATIC DESIGNATION | QTY. | DESCRIPTION | JERROLD PART NO. |
|---|---|---|---|---|
| | | | CAPACITORS | |
| 1 | C10, 12 | 2 | 0.9 to 7 pF, trimmer | 128-530 |
| 2 | C109, 110, 111 | 3 | 1000 pF, 20%, feed-thru | 129-110 |
| 3 | C206 | 1 | 0.02 μF, 25 V, lead forms air-coil L204 | 124-078 |
| 4 | C730, 731 | 2 | 470 pF, 10%, feed-thru | 129-150 |
| | | | CHOKES | |
| 5 | L102 | 1 | Filament | 157-005 |
| 6 | L308, 309 | 2 | 27 μH | 157-052 |
| | | | CONNECTORS | |
| 7 | J101, 102, 104, TP101, 102 | 5 | G-61, without hardware | 821-195 |
| 8 | TP104 | 1 | Tip jack, red | 185-133 |
| 9 | TP105 | 1 | Tip jack, violet | 185-134 |
| 10 | TP106 | 1 | Tip jack, grey | 185-135 |
| | | | RESISTORS | |
| 11 | R324, 328 | 2 | Factory selected | |
| 12 | R325 | 1 | 470 Ω, 1 W, 10% | 112-321 |
| 13 | R326A, 326B | 1 | 2 W, 10%, dual potentiometer | B118-171 |
| 14 | R327 | 1 | 1.2 kΩ, 1 W, 10% | 112-375 |

## MODEL SA-5AW

ASSEMBLY: 11 dB EQUALIZER P/C BOARD — REF. DWG. NO.: E861-828

| ITEM | SCHEMATIC DESIGNATION | QTY. | DESCRIPTION | JERROLD PART NO. |
|---|---|---|---|---|
| | | | CAPACITORS | |
| 1 | C501 | 1 | 2 to 8 pF, trimmer | 128-546 |
| 2 | C502, 503, 504 | 3 | 4.7 pF, 500 V, ±0.25 pF | 124-061 |
| 3 | C505 | 1 | 33 pF, 500 V, 5% | 124-125 |
| 4 | C506 | 1 | 12 pF, 500 V, '% | 124-135 |
| 5 | C507 | 1 | 8.2 pF, 500 V, ±0.5 pF | 124-103 |
| | | | RESISTORS | |
| 6 | R501, 502, 503, 504, 506 | 5 | 75 Ω, ¼ W, 5% | 112-954 |

## MODEL SA-6AW

ASSEMBLY: PLUG-IN CHASSIS — REF. DWG. NO.: E861-859

| ITEM | SCHEMATIC DESIGNATION | QTY. | DESCRIPTION | JERROLD PART NO. |
|---|---|---|---|---|
| | | | CAPACITORS | |
| 1 | C10 | 1 | 1.5 to 20 pF, trimmer | 128-537 |
| 2 | C109, 110, 111 | 3 | 1000 pF, 20%, feed-thru | 129-110 |
| 3 | C206 | 1 | 0.02 μF, 25 V, lead forms air-coil L204 | 124-078 |
| 4 | C322, 323 | 2 | 470 pF, 10%, feed-thru | 129-152 |
| | | | CHOKES | |
| 5 | L102 | 1 | Filament | 157-005 |
| 6 | L308, 39 | 2 | 2.7 μH | 157-052 |
| | | | CONNECTORS | |
| 7 | J101, 102, 103 104, TP101, 103 | 6 | G-61, without hardware | 821-195 |
| 8 | TP104 | 1 | Tip jack, red | 185-133 |
| 9 | TP105 | 1 | Tip jack, violet | 185-134 |
| 10 | TP106 | 1 | Tip jack, grey | 185-135 |
| | | | RESISTORS | |
| 11 | R324, 329 | 2 | Factory selected | |
| 12 | R325 | 1 | 470 Ω, 1 W, 10% | 112-321 |
| 13 | R326A, 326B | 1 | 25 kΩ, 2 W, dual potentiometer | B118-171 |
| 14 | R327 | 1 | 1.2 kΩ, 1 W, 10% | 112-375 |

## MODELS SA-1AW, SA-2AW, SA-3AW, SA-4AW, AND SA-6AW

ASSEMBLY: TRUNK LINE AMPLIFIER P/C BOARD — REF. DWG. NO.: E861-830, 838, 840, 842, 859

| ITEM | SCHEMATIC DESIGNATION | QTY. | DESCRIPTION | JERROLD PART NO. |
|---|---|---|---|---|
| | | | CAPACITORS | |
| 1 | C301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320 | 20 | 0.02 μF, 25 V | 124-078 |
| 2 | C321 | 1 | 2 pF, 10% | 122-030 |
| 3 | C322, 323 | 2 | 2 to 18.5 pF, trimmer | 128-570 |
| | | | CHOKE | |
| 4 | L303 | 1 | 27 μH | 157-052 |
| | | | RESISTORS | |
| 5 | R301 | 1 | 240 Ω, ¼ W, 5% | 112-975 |
| 6 | R302, 317 | 2 | 24 Ω, ¼ W, 5% | 112-985 |
| 7 | R303 | 1 | 3 kΩ, ¼ W, 5% | 112-934 |
| 8 | R304 | 1 | 1.1 kΩ, ¼ W, 5% | 112-927 |
| 9 | R305 | 1 | 120 Ω, ¼ W, 5% | 112-093 |
| 10 | R306 | 1 | 680 Ω, ½ W, 5%, wirewound | 113-092 |
| 11 | R307 | 1 | 270 Ω, ¼ W, 5% | 112-993 |
| 12 | R308, 314 | 2 | 3.6 kΩ, ¼ W, 5% | 112-999 |
| 13 | R309 | 1 | 22 Ω, ¼ W, 5% | 112-971 |
| 14 | R310 | 1 | 62 Ω, ¼ W, 5% | 112-089 |
| 15 | R311, 312, 323 | 3 | 75 Ω, ¼ W, 5% | 112-954 |
| 16 | R313 | 1 | 500 Ω, 20%, potentiometer | 118-141 |
| 17 | R315 | 1 | 2.4 kΩ, ¼ W, 5% | 112-918 |
| 18 | R316 | 1 | 100 Ω, ¼ W, 5% | 112-950 |
| 19 | R318 | 1 | 180 Ω, ¼ W, 5% | 112-994 |
| 20 | R319 | 1 | 1.3 kΩ, ¼ W, 5% | 112-064 |
| 21 | R320 | 1 | 1.6 kΩ, ¼ W, 5% | 111-012 |
| 22 | R321, 330 | 2 | 27 Ω, ¼ W, 5% | 112-085 |
| 23 | R322 | 1 | 100 Ω, ½ W, 5% | 112-233 |
| | | | THERMISTOR | |
| 24 | RT301 | 1 | 30 Ω, 10% @ 30° C | 110-140 |
| | | | TRANSISTORS | |
| 25 | Q301, 302, 305, 306 | 4 | Factory selected | S130-150-1 |
| 26 | Q303, 304 | 2 | Factory selected | S130-147 |

## MODELS SA-1AW AND SA-3AW

ASSEMBLY: AGC P/C BOARD — REF. DWG. NO.: E861-838, 842

| ITEM | SCHEMATIC DESIGNATION | QTY. | DESCRIPTION | JERROLD PART NO. |
|---|---|---|---|---|
| | | | CAPACITORS | |
| 1 | C703, 704, 705, 706, 707, 708, 710, 711, 712, 713, 714, 715, 716, 717, 733 | 15 | 0.02 μF, 25 V | 124-078 |
| 2 | C709 | 1 | 39 pF, 500 V, 5% | 124-126 |
| 3 | C732 | 1 | 150 μF, 25 V | 127-124 |
| | | | CHOKES | |
| 4 | L703 | 1 | 0.68 μH | 157-051 |
| 5 | L704 | 1 | 27 μH | 157-052 |
| | | | DIODES | |
| 6 | CR701, 702 | 2 | K3A | 139-102 |
| | | | RESISTORS | |
| 7 | R701 | 1 | 1.1 kΩ, ¼ W, 5% | 112-927 |
| 8 | R702 | 1 | 1.3 kΩ, ¼ W, 5% | 112-064 |
| 9 | R703 | 1 | 680 Ω, ½ W, 5% | 112-338 |
| 10 | R705 | 1 | 600 Ω, 1 W, 5% | 110-102 |
| 11 | R707 | 1 | 1 kΩ, ¼ W, 5% | 112-977 |
| 12 | R708 | 1 | 2.7 kΩ, ¼ W, 5% | 112-931 |
| 13 | R709 | 1 | 47 kΩ, ¼ W, 5% | 111-004 |
| 14 | R710 | 1 | 270 Ω, ¼ W, 5% | 112-993 |
| 15 | R711, 720 | 2 | 560 Ω, ¼ W, 5% | 112-104 |
| 16 | R712 | 1 | 6.2 kΩ, ¼ W, 5% | 112-981 |
| 17 | R713, 721 | 2 | 3 kΩ, ¼ W, 5% | 112-934 |
| 18 | R714 | 1 | 5.1 kΩ, ¼ W, 5% | 112-980 |
| 19 | R715 | 1 | 5.6 kΩ, ¼ W, 5% | 112-919 |
| 20 | R716 | 1 | 100 Ω, ¼ W, 5% | 112-950 |
| 21 | R717 | 1 | 1.2 kΩ, ¼ W, 5% | 112-921 |
| 22 | R718 | 1 | 500 Ω, 20%, potentiometer | 118-141 |
| 23 | R719 | 1 | 75 Ω, ¼ W, 5% | 112-954 |
| 24 | R722 | 1 | 4.7 kΩ, ¼ W, 5% | 111-001 |
| | | | THERMISTOR | |
| 25 | RT701 | 1 | 1 kΩ @ 25° C | 110-042 |
| | | | SWITCH | |
| 26 | S701 | 1 | Slide, DPDT, gold plated shoes and contacts | 162-037 |
| | | | TRANSISTORS | |
| 27 | Q701, 702, 703, 704 | 4 | 2N956 | 130-149 |
| 28 | Q705, 706, 707 | 3 | S1140, selected | 130-112 |

## MODELS SA-1AW THROUGH SA-6AW

ASSEMBLY: D.C. POWER SUPPLY — REF. DWG. NO.: E861-828, 830, 838, 840, 842, 859

| ITEM | SCHEMATIC DESIGNATION | QTY. | DESCRIPTION | JERROLD PART NO. |
|---|---|---|---|---|
| | | | CAPACITORS | |
| 1 | C101, 105 | 2 | 0.01 μF, disc | 124-031 |
| 2 | C102, 103, 106, 107 | 4 | 400 μF, 40 V | 127-135 |
| 3 | C104, 108 | 2 | 250 μF, 40 V | 127-134 |
| | | | CHOKE | |
| 4 | L101 | 1 | Filter | B143-129 |
| | | | DIODES | |
| 5 | CR101, 107 | 2 | Rectifier, Silicon, 200 PIV, 140 V rms, 3 A | 137-737 |
| 6 | CR102, 103, 104, 108, 109 | 5 | Rectifier, Silicon, 100 PIV, 70 V rms | 137-718 |
| 7 | CR105 | 1 | Zener, 15.7 V d.c. ±2%, 1 W | 137-758 |
| 8 | CR106 | 1 | Zener, 15.3 V d.c. ±2%, 1 W | 137-759 |
| | | | RESISTORS | |
| 9 | R101, 102, 103, 104 | 4 | 150 Ω, 3 W, 5% | 110-103 |
| 10 | R105, 106 | 2 | 1 Ω, 2 W, 5% | 110-105 |
| | | | TRANSISTORS | |
| 11 | Q101 | 1 | 2N456A | 130-146 |
| 12 | Q102 | 1 | 36714 | 130-104 |

## MODEL SA-5AW

ASSEMBLY: INTERMEDIATE BRIDGING AMPLIFIER P/C BOARD — REF. DWG. NO.: E861-828

| ITEM | SCHEMATIC DESIGNATION | QTY. | DESCRIPTION | JERROLD PART NO. |
|---|---|---|---|---|
| | | | CAPACITORS | |
| 1 | C601 | 1 | 2 to 8 pF, trimmer | 128-546 |
| 2 | C602, 603, 604, 605, 606, 607, 608, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628 | 26 | 0.02 μF, 25 V | 124-078 |
| 3 | C609 | 1 | 9.1 pF, 600 V, 5% | 124-108 |
| | | | RESISTORS | |
| 4 | R604, 621 | 2 | 910 Ω, ¼ W, 5% | 112-920 |
| 5 | R605, 607, 623, 626 | 5 | 22 Ω, ¼ W, 5% | 112-971 |
| 6 | R606 | 1 | 220 Ω, ¼ W, 5% | 112-095 |
| 7 | R608, 611 | 2 | 4.3 kΩ, ¼ W, 5% | 111-006 |
| 8 | R609, 625, 628, 629 | 4 | 270 Ω, ¼ W, 5% | 112-993 |
| 9 | R610 | 1 | 150 Ω, ¼ W, 5% | 112-974 |
| 10 | R612 | 1 | 75 Ω, ¼ W, 5% | 112-954 |
| 11 | R613, 615 | 2 | 500 Ω, 20%, potentiometer | 118-141 |
| 12 | R614 | 1 | 47 Ω, ¼ W, 5% | 112-992 |
| 13 | R616 | 1 | 100 Ω, ¼ W, 5% | 112-950 |
| 14 | R617 | 1 | 2.2 kΩ, ¼ W, 5% | 112-932 |
| 15 | R618 | 1 | 820 Ω, ¼ W, 5% | 112-976 |
| 16 | R620 | 1 | 130 Ω, ¼ W, 5% | 112-997 |
| 17 | R622 | 1 | 2 kΩ, ¼ W, 5% | 112-930 |
| 18 | R624 | 1 | 62 Ω, ¼ W, 5% | 112-089 |
| 19 | R627 | 1 | 2.4 kΩ, ¼ W, 5% | 112-918 |
| 20 | R630 | 1 | 1.6 kΩ, ¼ W, 5% | 111-012 |
| 21 | R631 | 1 | 1.3 kΩ, ¼ W, 5% | 112-064 |
| 22 | R632 | 1 | 18 Ω, ¼ W, 5% | 112-082 |
| 23 | R633 | 1 | 110 Ω, ½ W, 5% | 112-242 |
| | | | TRANSISTORS | |
| 24 | Q601, 602 | 2 | A490, selected | S130-152 |
| 25 | Q603 | 1 | Factory selected | S130-144-1 |
| 26 | Q604, 605 | 2 | Factory selected | S130-174-1 |
| 27 | Q606 | 1 | Factory selected | S130-150-1 |

## MODELS SA-1AW, SA-2AW, SA-5AW, SA-6AW

ASSEMBLY: CONNECTOR CHASSIS TYPE WB — REF. DWG. NO.: 861-828, 830, 838, 859

| ITEM | SCHEMATIC DESIGNATION | QTY. | DESCRIPTION | JERROLD PART NO. |
|---|---|---|---|---|
| | | | CAPACITORS | |
| 1 | C1, 6, 9, 20, 23, 29 | 6 | 0.8 to 4.5 pF, trimmer | 128-573 |
| 2 | C2, 28 | 2 | 130 pF, 500 V, 5% | 126-097 |
| 3 | C3, 4, 7, 10, 11, 12, 13, 14, 15, 16, 17, 25, 27, 30, 31 | 15 | 0.01 μF, 250 V, 20% | 125-300 |
| 4 | C5, 8, 21, 24 | 4 | 110 pF, 500 V, 5% | 126-174 |
| 5 | C18, 26 | 2 | 1.0 pF, 500 V, 10% | 122-004 |
| 6 | C19, 22 | 2 | 1.5 pF, 500 V, 10% | 122-006 |
| | | | CHOKES | |
| 7 | L14, 15 | 2 | 1.2 μH | 157-024 |
| 8 | L16, 17, 18, 19 | 4 | 1.5 μH | 157-025 |
| | | | CONNECTORS | |
| 9 | J1 | 1 | Socket, power | A182-607 |
| 10 | P1 | 1 | Plug, power | B812-288 |
| 11 | P101, 102, 103, 104, Dist. Out, 1, 2, 3, 4 | 9 | Chassis fitting, PG-61 | B821-227-0 |

**MODELS SA-1AW THROUGH SA-6AW**

ASSEMBLY: HOUSING WITH LID — REF. DWG. NO.

| ITEM | SCHEMATIC DESIGNATION | QTY. | DESCRIPTION | JERROLD PART NO. |
|---|---|---|---|---|
| 1 | — | 1 | Chart, maintenance | B219-386 |
| 2 | — | 2 | Clamp, messenger, bottom | C228-197 |
| 3 | — | 2 | Clamp, messenger, top | C228-196 |
| 4 | — | 2 | Contact, spring | B215-234 |
| 5 | — | 1 | Cover, station housing | E228-168 |
| 6 | — | 1 | Housing, station | E228-167 |
| 7 | — | 1 | Gasket, molded | B295-134 |
| 8 | — | 3 | Plug, test assembly | B821-255 |
| 9 | — | 41″ | Shielding, r-f | 616-012 |

**MODELS SA-3AW, SA-4AW**

ASSEMBLY: CONNECTOR CHASSIS TYPE NB — REF. DWG. NO.: E861-840, 842

| ITEM | SCHEMATIC DESIGNATION | QTY. | DESCRIPTION | JERROLD PART NO. |
|---|---|---|---|---|
| | | | CAPACITORS | |
| 1 | C1, 9 | 2 | 0.8 to 4.5 pF, trimmer | 128-573 |
| 2 | C2, 8 | 2 | 130 pF, 500 V, 5% | 126-097 |
| 3 | C3 thru 7 | 5 | 0.01 μF, 250 V, 20% | 125-300 |
| | | | CHOKES | |
| 4 | L4, 5 | 2 | 1.5 μH | 157-025 |
| | | | CONNECTORS | |
| 5 | J1 | 1 | Socket, power | A182-607 |
| 6 | P1 | 1 | Plug, power | B812-288 |
| 7 | P101, 102, 104 | 3 | Chassis fitting, PG-61 | B812-227-0 |

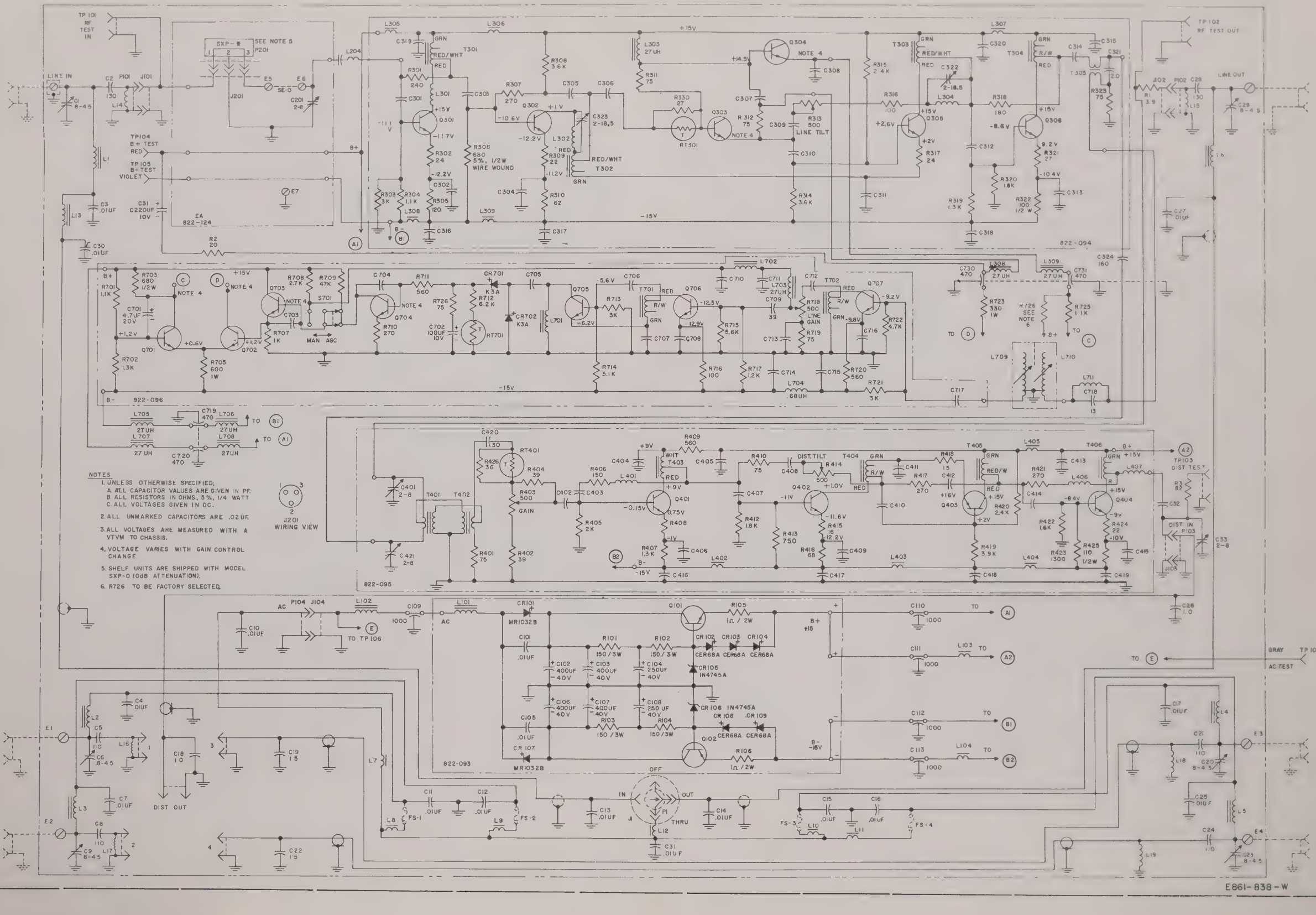
All data subject to change without notice.

**JERROLD ELECTRONICS CORPORATION**
CATV SYSTEMS DIVISION
Philadelphia, Pa. 19105



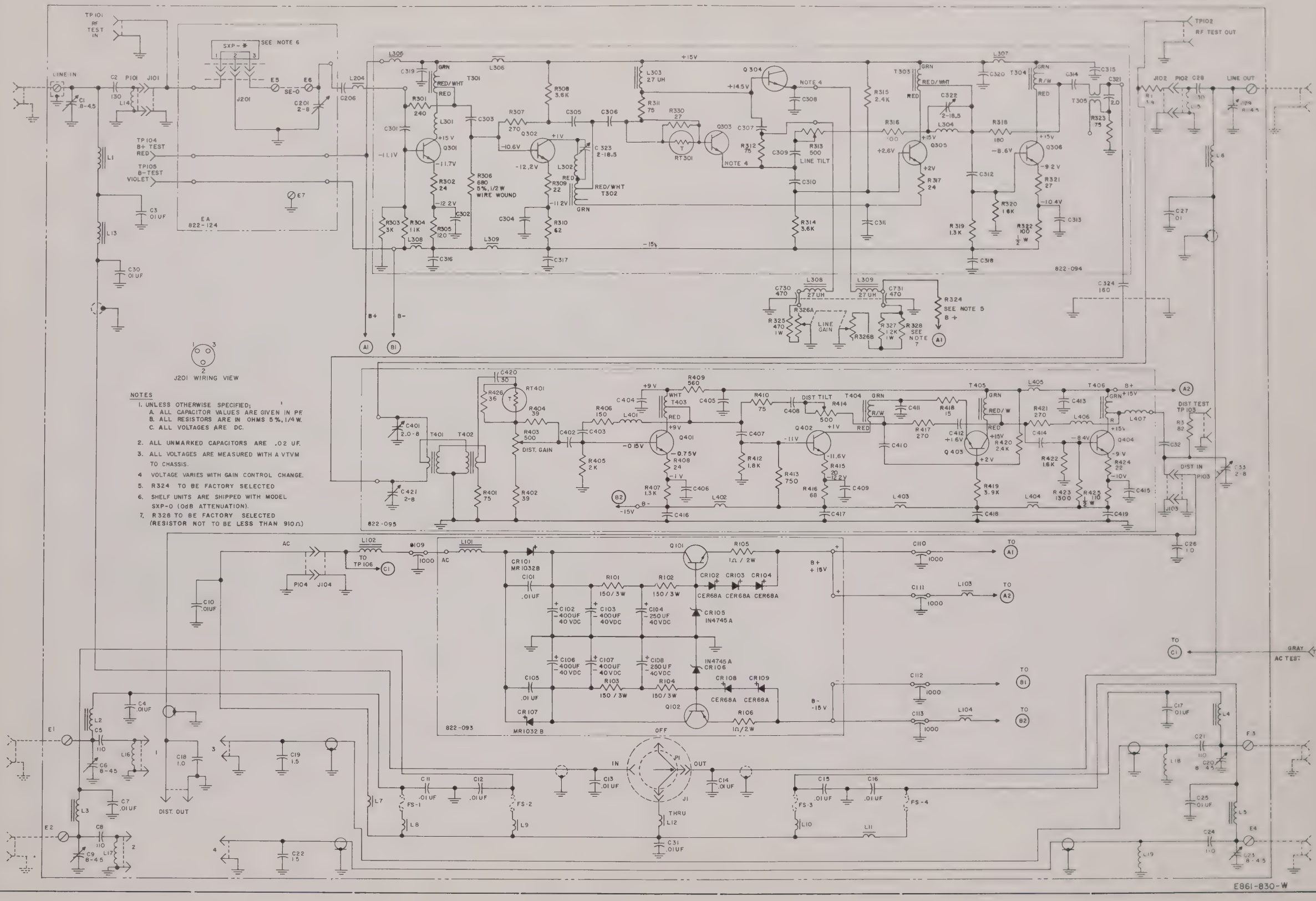
**Published by the Jerrold Electronics Corporation, Engineering Laboratory Publications Department**
Printed in the U.S.A. KM, 4/68 435-533-1 Part C 48225

# SCHEMATIC
# STARLINE AMPLIFIER
## MODEL SA-1-AW & SA-1-AW-VI



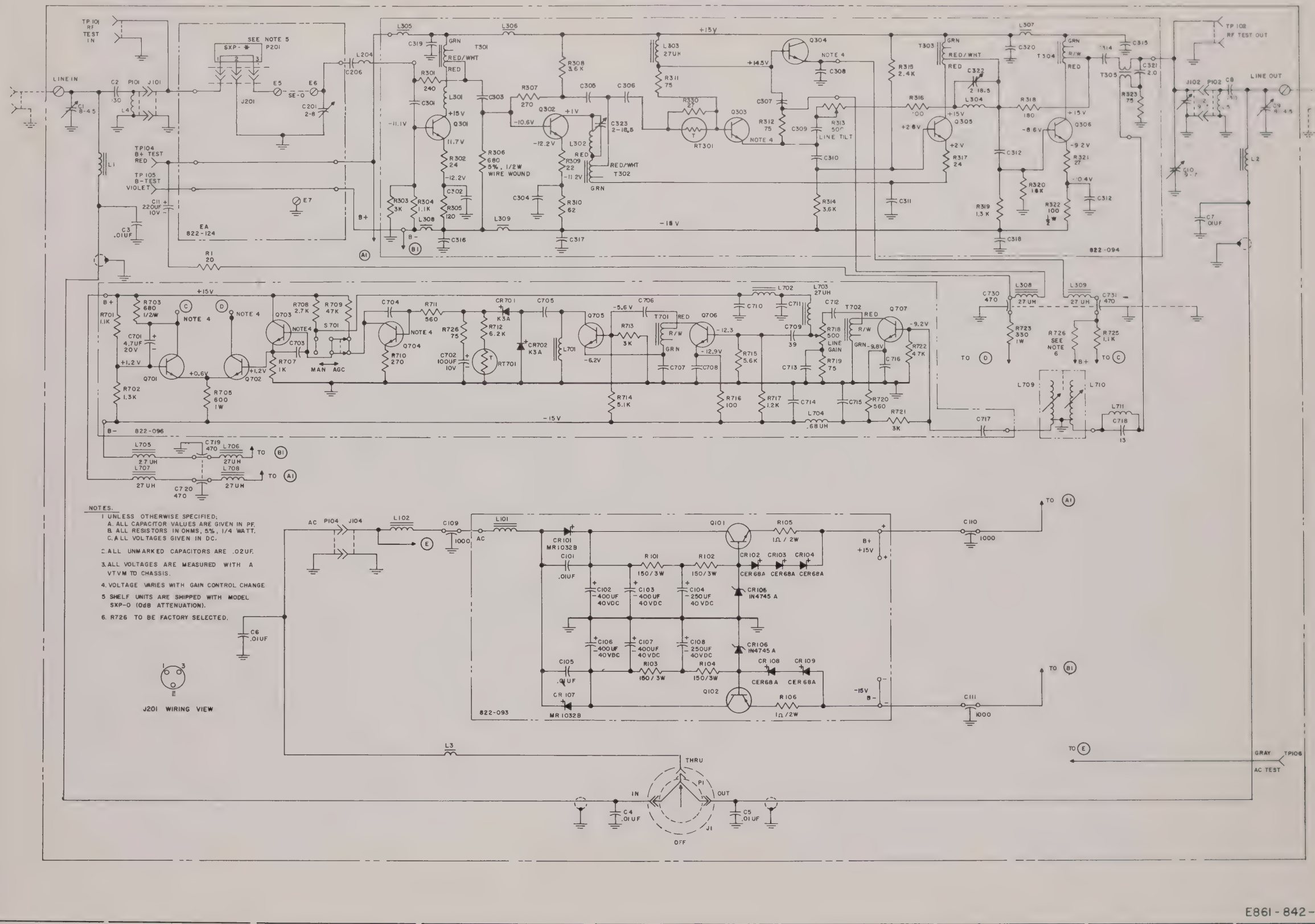

E861-838-W

# SCHEMATIC
# STARLINE AMPLIFIER
## MODEL SA-2-AW & SA-2-AW-VI




E861-830-W

# SCHEMATIC
# STARLINE AMPLIFIER
## MODEL SA-3-AW & SA-3-AW-VI



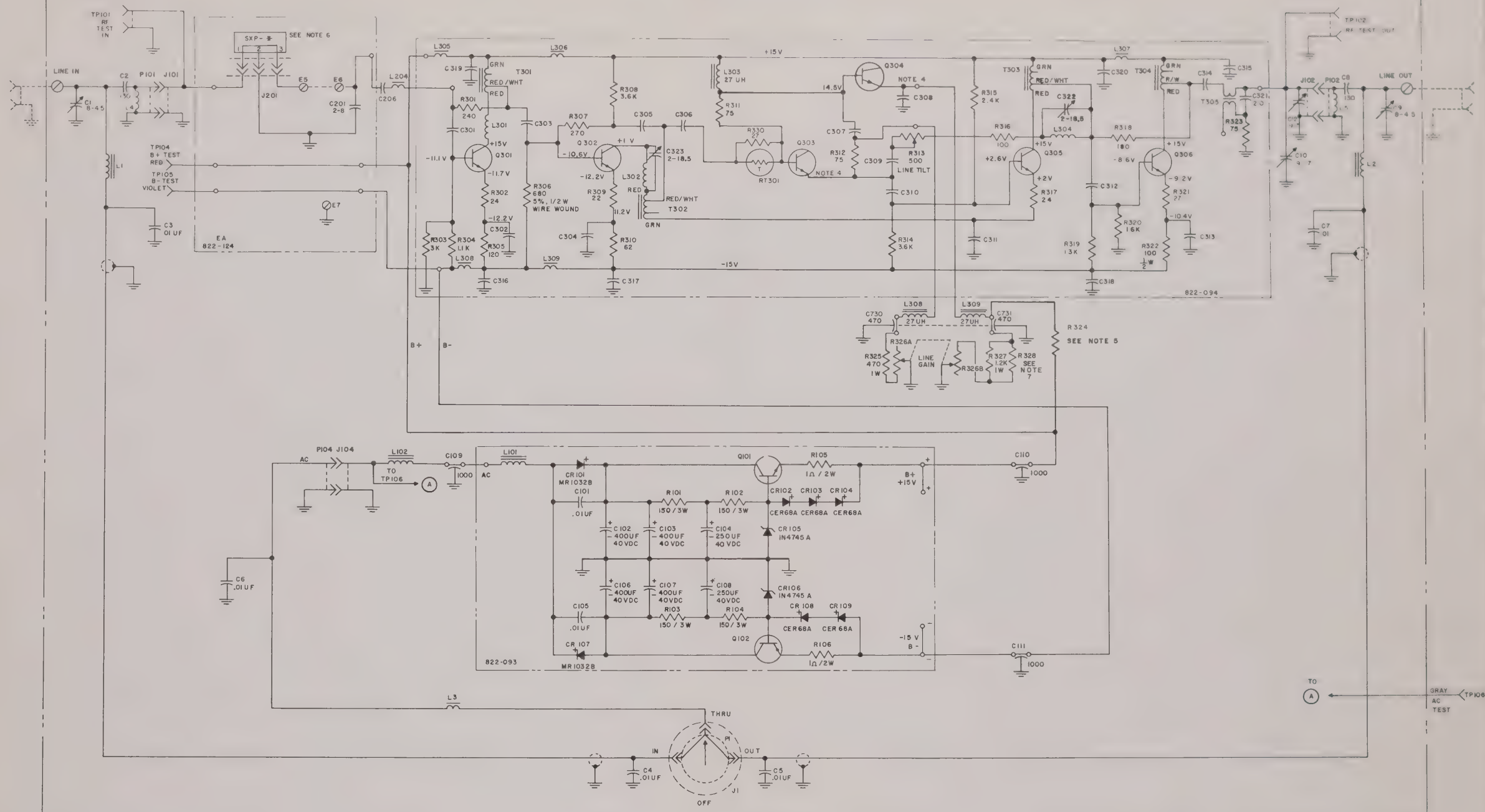

NOTES.

1. UNLESS OTHERWISE SPECIFIED;
   A. ALL CAPACITOR VALUES ARE GIVEN IN PF.
   B. ALL RESISTORS IN OHMS, 5%, 1/4 WATT.
   C. ALL VOLTAGES GIVEN IN DC.
2. ALL UNMARKED CAPACITORS ARE .02UF.
3. ALL VOLTAGES ARE MEASURED WITH A VTVM TO CHASSIS.
4. VOLTAGE VARIES WITH GAIN CONTROL CHANGE
5. SHELF UNITS ARE SHIPPED WITH MODEL SXP-0 (0dB ATTENUATION).
6. R726 TO BE FACTORY SELECTED.




J201 WIRING VIEW

# SCHEMATIC
# STARLINE AMPLIFIER
## MODEL SA-4-AW & SA-4-AW-VI



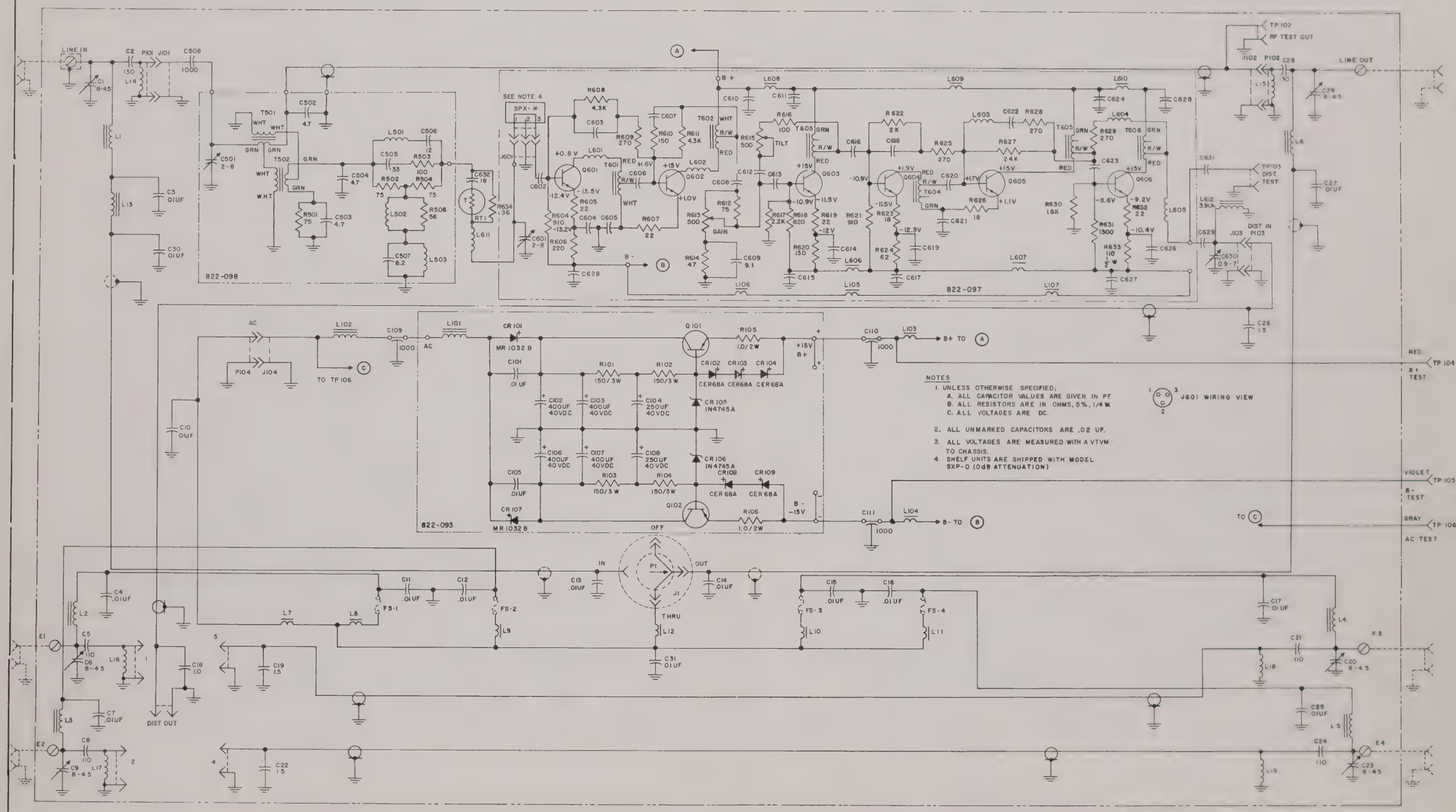

NOTES

1. UNLESS OTHERWISE SPECIFIED;
   A. ALL CAPACITOR VALUES ARE GIVEN IN PF.
   B. ALL RESISTORS ARE IN OHMS, 5%, 1/4W.
   C. ALL VOLTAGES ARE DC.
2. ALL UNMARKED CAPACITORS ARE .02 UF.
3. ALL VOLTAGES ARE MEASURED WITH A VTVM TO CHASSIS.
4. VOLTAGE VARIES WITH GAIN CONTROL CHANGE.
5. R324 TO BE FACTORY SELECTED
6. SHELF UNITS ARE SHIPPED WITH MODEL SXP-0(10dB of ATTENUATION).
7. R328 TO BE FACTORY SELECTED (RESISTOR NOT TO BE LESS THAN 910Ω)

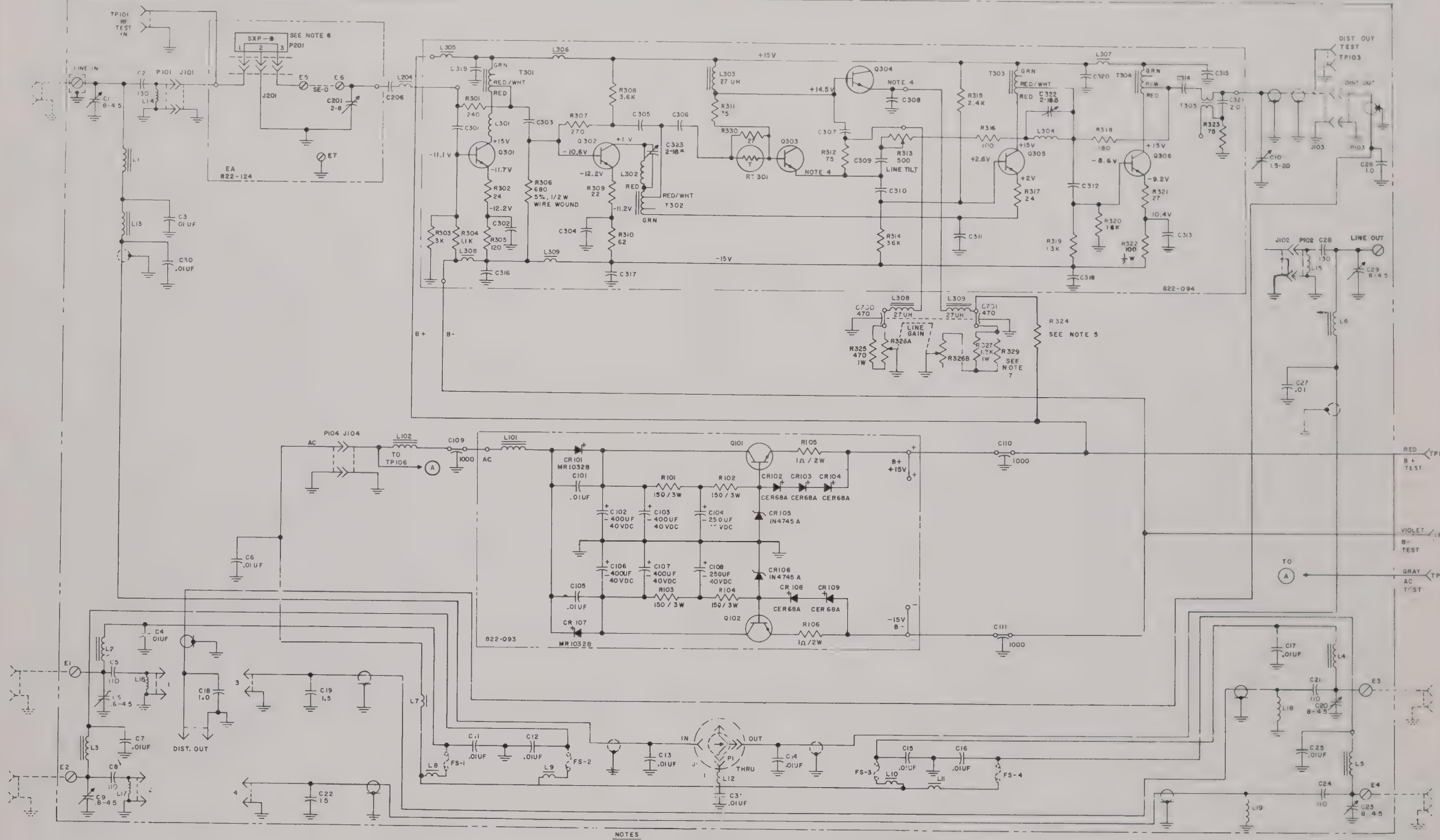
J201 WIRING VIEW

E861-840-P

# SCHEMATIC
# STARLINE AMPLIFIER
# MODEL SA-5AW
# & SA-5AW-VI



# SCHEMATIC
# STARLINE AMPLIFIER
# MODEL SA-6-AW & SA-6AW-VI




NOTES

1 UNLESS OTHERWISE SPECIFIED;
- A. ALL CAPACITOR VALUES ARE GIVEN IN PF.
- B ALL RESISTORS ARE IN OHMS, 5%, 1/4W.
- C. ALL VOLTAGES ARE DC.

2 ALL UNMARKED CAPACITORS ARE .02 UF.

3 ALL VOLTAGES ARE MEASURED WITH A VTVM TO CHASSIS.

4. VOLTAGE VARIES WITH GAIN CONTROL CHANGE.

5 R324 TO BE FACTORY SELECTED

6. SHELF UNITS ARE SHIPPED WITH MODEL SXP-0 (0dB ATTENUATION)

7. R329 TO BE FACTORY SELECTED (RESISTOR NOT TO BE LESS THAN 910Ω)

E861-859-K

JERROLD®

INSTRUCTION SHEET
435-533-1
Part C
AMENDMENTS A1

# STARLINE AMPLIFIERS
# MODELS SA-*AW AND SA-*AW-VI

## INTRODUCTION

These amendments update information contained in Instruction Sheet 435-533-1, Part C (Maintenance) covering Starline Amplifiers, Models SA-*AW and SA-*AW-VI. The information presented here applies to amplifier units bearing Serial Nos. 57542 and above.

## CHANGES

1. Page 7, Section 4.1, para. 2, line 3: change to read, "voltages (+13.25 V d.c. and -13.25 V d.c.) required".

2. Page 7, Section 4.1, para. 6, line 6: change to read, "CR109 the B-voltage is fed through C111 (C112 on the SA-1AW and SA-2AW) and".

3. Page 11, Section 5.3.1, para. 1, line 1: change to read, "the meter should indicate 13.25 V within ±0.55 V".

4. Page 11, Section 5.3.3, para. 2: change to read, "At check point A the meter should indicate +13.25 ±0.55 V d.c. If the voltage is incorrect, check capacitor C110 (and C111 on the SA-1AW and SA-2AW) and resistor R105; replace a faulty component if necessary, then check the voltage at the B+ test jack.".

5. Page 11, Section 5.3.4, para. 1, line 3: change to read, "13.7 ±0.25 V d.c. If the voltage is correct".

6. Page 12, Section 5.3.6, para. 1, lines 4 and 5: change to read, "-13.5 ±0.5 V d.c. If the voltage is incorrect, check capacitor C111 (C112 and C113 on the SA-1AW and SA-2AW) and resistor R106.".

7. Page 12, Section 5.3.6, para. 1, line 9: change to read, "should indicate -13.3 ±0.25 V d.c. If the voltage".

8. Page 13, Table 2: change to read as follows.

TABLE 2. TRUNKLINE AMPLIFIER D.C. VOLTAGE CHECKS

| Stage | Q301 | Q302 | Q303 | Q304 | Q305 | Q306 |
|---|---|---|---|---|---|---|
| Emitter | -10.4 | -9.9 | * | * | +1.5 | -4.4 |
| Base | -9.7 | -9.2 | * | +12.8 | +2.2 | -3.7 |
| Collector | +13.25 | +0.5 | ---- | ---- | +13.25 | +13.25 |
| Across R305 | 2.3±0.3 | ---- | ---- | ---- | ---- | ---- |
| Across R310 | ---- | 2.4±0.3 | ---- | ---- | ---- | ---- |
| Across R322 | ---- | ---- | ---- | ---- | ---- | 7.65±0.85 |

9. Page 13, Table 3: change to read as follows.

TABLE 3. AGC CIRCUIT D.C. VOLTAGE CHECKS

| Stage | Q707 | Q706 | Q705 | Q704 | Q703 | Q702 | Q701 |
|---|---|---|---|---|---|---|---|
| Emitter | -9.7 | -11.7 | -5.7 | * | * | +0.5 | +0.5 |
| Base | -9.0 | -11.0 | -5.0 | * | * | +1.2 | +1.2 |
| Collector | 0 | -5.7 | 0 | * | * | * | * |

10. Page 14. Table 4: change to read as follows.

TABLE 4. BRIDGING AMPLIFIER D.C. VOLTAGE CHECKS

| Stage | Q401 | Q402 | Q403 | Q404 |
|---|---|---|---|---|
| Emitter | -1.0 | -10.2 | +2.0 | -4.3 |
| Base | -0.3 | -9.5 | +2.7 | -3.6 |
| Collector | +8.0 | +1.5 | +13.25 | +13.25 |
| Across R407 | 12 ±1.3 | ---- | ---- | ---- |
| Across R415 | ---- | 2.5 ±0.3 | ---- | ---- |
| Across R425 | ---- | ---- | ---- | 7.85 ±0.85 |

11. Page 14, Table 5: change to read as follows.

TABLE 5. INTERMEDIATE BRIDGING AMPLIFIER D.C. VOLTAGE CHECKS

| Stage | Q601 | Q602 | Q603 | Q604 | Q605 | Q606 |
|---|---|---|---|---|---|---|
| Emitter | -11.5 | +0.3 | -10.3 | -9.9 | +0.6 | -4.3 |
| Base | -10.8 | +1.0 | -9.6 | -9.2 | +1.3 | -3.6 |
| Collector | +0.15 | +13.25 | +13.25 | 0 | +13.25 | +13.25 |
| Across R620 | ---- | ---- | 2.5 ±0.3 | ---- | ---- | ---- |
| Across R624 | ---- | ---- | ---- | 2.65 ±0.35 | ---- | ---- |
| Across R633 | ---- | ---- | ---- | ---- | ---- | 7.65 ±0.85 |

12. Relacement Parts List changes.

| Item | Schematic Designation | Qty. | Description | Jerrold Part No. |
|---|---|---|---|---|
| | | Page 24, Bridging Amplifier P/C Board | | |
| 9 | R407 | 1 | 1.3 kΩ, 1/4 W, 5% | 112-064 |
| 12 | R412, 423 | 2 | 1.8 kΩ, 1/4 W, 5% | 112-972 |
| 20 | R422 | 1 | 620 Ω, 1/4 W, 5% | 112-998 |
| 22 | R425 | 1 | 150 Ω, 1 W, 5% | 113-196 |
| 27 | Q404 | 1 | Factory selected | S130-245-1 |
| | | Page 25, Plug-In Chassis (for SA-3AW and SA-4AW) | | |
| 1 | C10 | 1 | 0.9 to 7 pF, trimmer | 128-530 |
| | | Page 25, Trunkline Amplifier P/C Board | | |
| 3 | C322, 323 | 2 | 2 to 18 pF, trimmer | 128-579 |
| 3A (add) | C324 | 1 | 2.7 pF, 10% | 122-009 |
| 5 | R301, 307 | 2 | 270 Ω, 1/4 W, 5% | 112-993 |
| 11 | Delete | | | |
| 13 | R309, 321 | 2 | 22 Ω, 1/4 W, 5% | 112-971 |
| 19 | R318 | 1 | 220 Ω, 1/4 W, 5% | 112-095 |
| 20 | R319 | 1 | 1.8 kΩ, 1/4 W, 5% | 112-972 |
| 21 | R320 | 1 | 620 Ω, 1/4 W, 5% | 112-998 |
| 22 | R330 | 1 | 27 Ω, 1/2 W, 5% | 112-085 |
| 23 | R322 | 1 | 130 Ω, 1 W, 5% | 113-195 |
| 25 | Q301, 302, 305 | 3 | Factory selected | S130-150-1 |
| 27 (add) | Q306 | 1 | Factory selected | S130-245-1 |
| | | Page 26, AGC P/C Board | | |
| 3A (add) | C734 | 1 | 4.7 pF, 20 V | S127-079 |
| 4 | L703 | 1 | 27 μH | 157-052 |
| 5 | L704 | 1 | 0.68 μH | 157-051 |
| 16 | Delete | | | |
| 17 | R712, 713, 721 | 3 | 3 kΩ, 1/4 W, 5% | 112-934 |
| | | Page 26, D.C. Power Supply | | |
| 2 | C102, 103, 106, 107 | 4 | 470 μF, 40 V | S127-151 |
| 3 | C104, 108 | 2 | 220 μF, 40 V | S127-165 |
| 7 | CR105 | 1 | Zener | S137-818 |
| 8 | CR106 | 1 | Zener | S137-819 |
| 9 | R101, 102, 103, 104 | 4 | 180 Ω, 3W, 5% | 113-197 |
| 11 | Q101 | 1 | 36714 | 130-146 |
| 12 | Q102 | 1 | 2N456A | 130-104 |

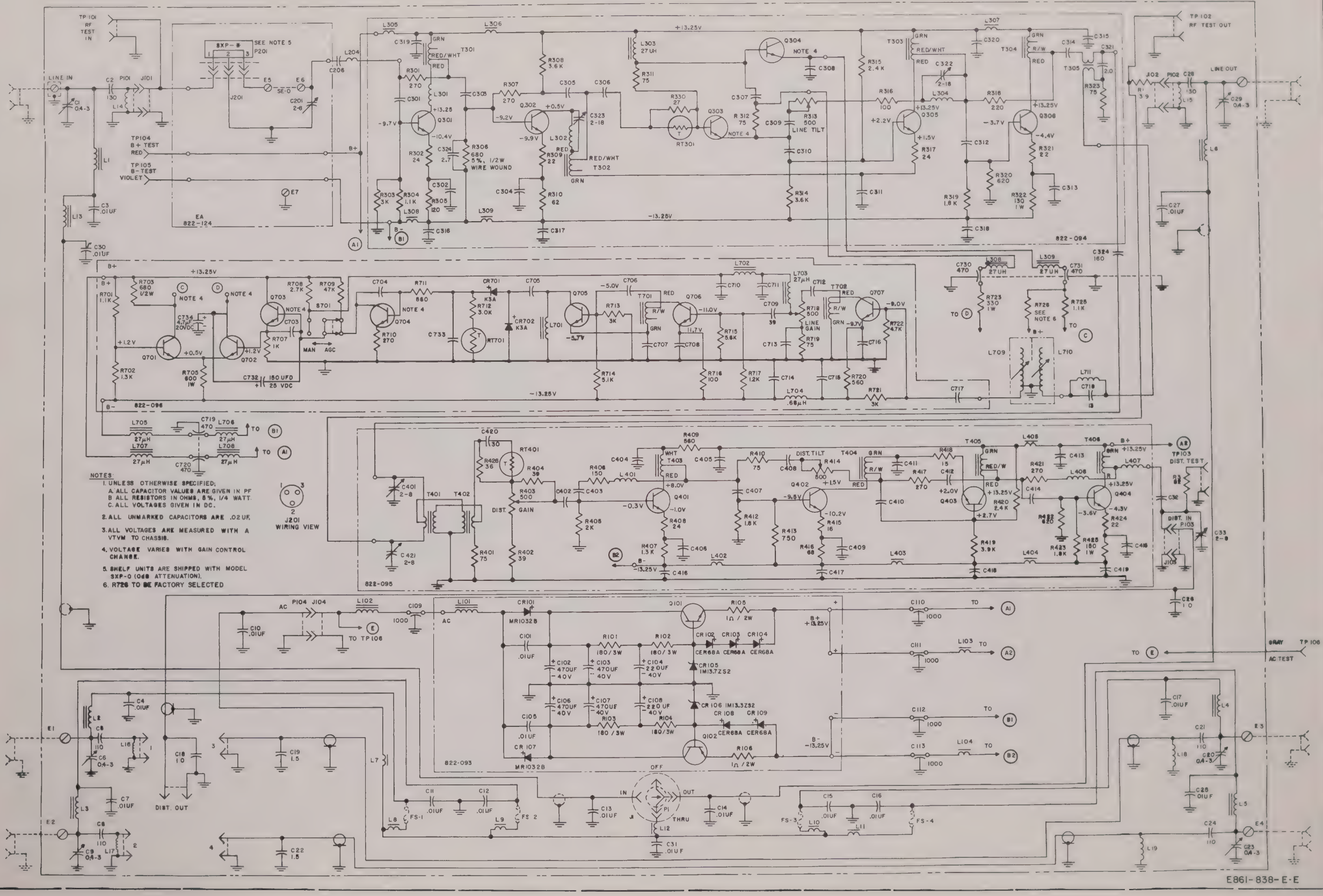
12. Replacement Parts List changes (continued).

| Item | Schematic Designation | Qty. | Description | Jerrold Part No. |
|---|---|---|---|---|
| | | | Page 26, Intermediate Bridging Amplifier P/C Board | |
| 5 | R605, 607, 619, 632 | 4 | 22 Ω, 1/4 W, 5% | 112-971 |
| 20 | R630 | 1 | 620 Ω, 1/4 W, 5% | 112-998 |
| 21 | R631 | 1 | 1.8 kΩ, 1/4 W, 5% | 112-972 |
| 22 | R623, 626 | 2 | 18 Ω, 1/4 W, 5% | 112-082 |
| 23 | R633 | 1 | 150 Ω, 1 W, 5% | 113-196 |
| 27 | Q606 | 1 | Factory selected | S130-245-1 |
| | | | Page 26, Connector Chassis Type WB | |
| 1 | C1, 6, 9, 20, 23, 29 | 6 | 0.4 to 3 pF, trimmer | S128-580 |
| 7 | L14, 15 | 2 | 1.5 μH | 157-025 |
| 8 | L16, 17, 18, 19 | 4 | 1.2 μH | 157-024 |
| | | | Page 27, Connector Chassis Type NB | |
| 1 | C1, 9 | 2 | 0.4 to 3 pF, trimmer | S128-580 |

13. Schematic Diagrams: substitute the attached schematic diagrams for those in the Instruction Sheet

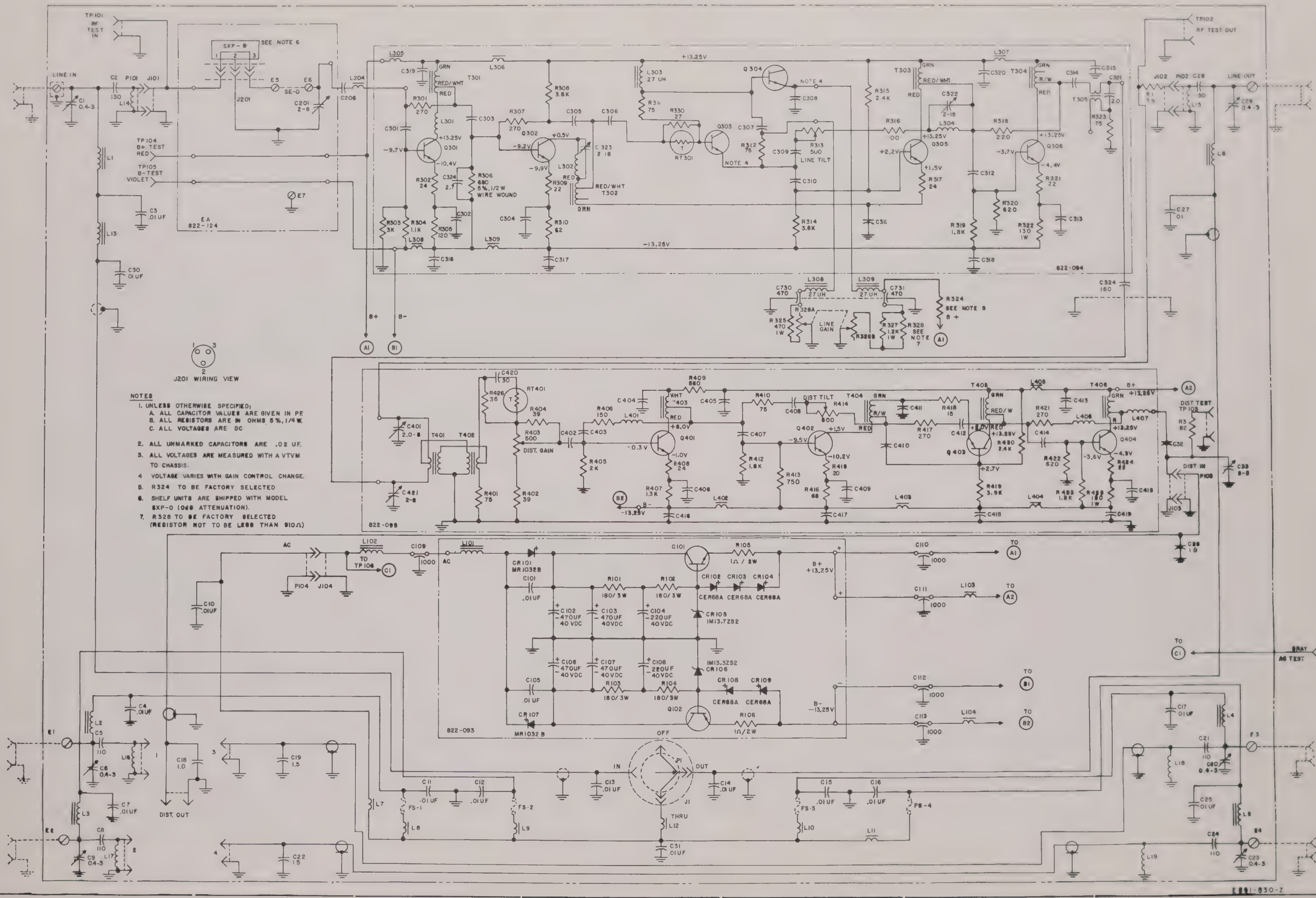
JERROLD ELECTRONICS CORPORATION - CATV SYSTEMS DIVISION
Philadelphia, Pa. 19105
AM 4/69

# SCHEMATIC
# STARLINE AMPLIFIER
## MODEL SA-1-AW & SA-1-AW-VI




E861-838-E-E

# SCHEMATIC
# STARLINE AMPLIFIER
## MODEL SA-2-AW & SA-2-AW-VI



E861 - 842 -Y

# SCHEMATIC
# STARLINE AMPLIFIER
# MODEL SA-3-AW & SA-3-AW-VI

NOTES.
1. UNLESS OTHERWISE SPECIFIED,
A. ALL CAPACITOR VALUES ARE GIVEN IN PF
B. ALL RESISTORS IN OHMS, 5%, 1/4 WATT.
C.ALL VOLTAGES GIVEN IN DC.
2.ALL UNMARKED CAPACITORS ARE .02UF
3.ALL VOLTAGES ARE MEASURED WITH A VTVM TO CHASSIS.
4.VOLTAGE VARIES WITH GAIN CONTROL CHANGE.
5 SHELF UNITS ARE SHIPPED WITH MODEL SXP-O (0dB ATTENUATION).
6 R726 TO BE FACTORY SELECTED

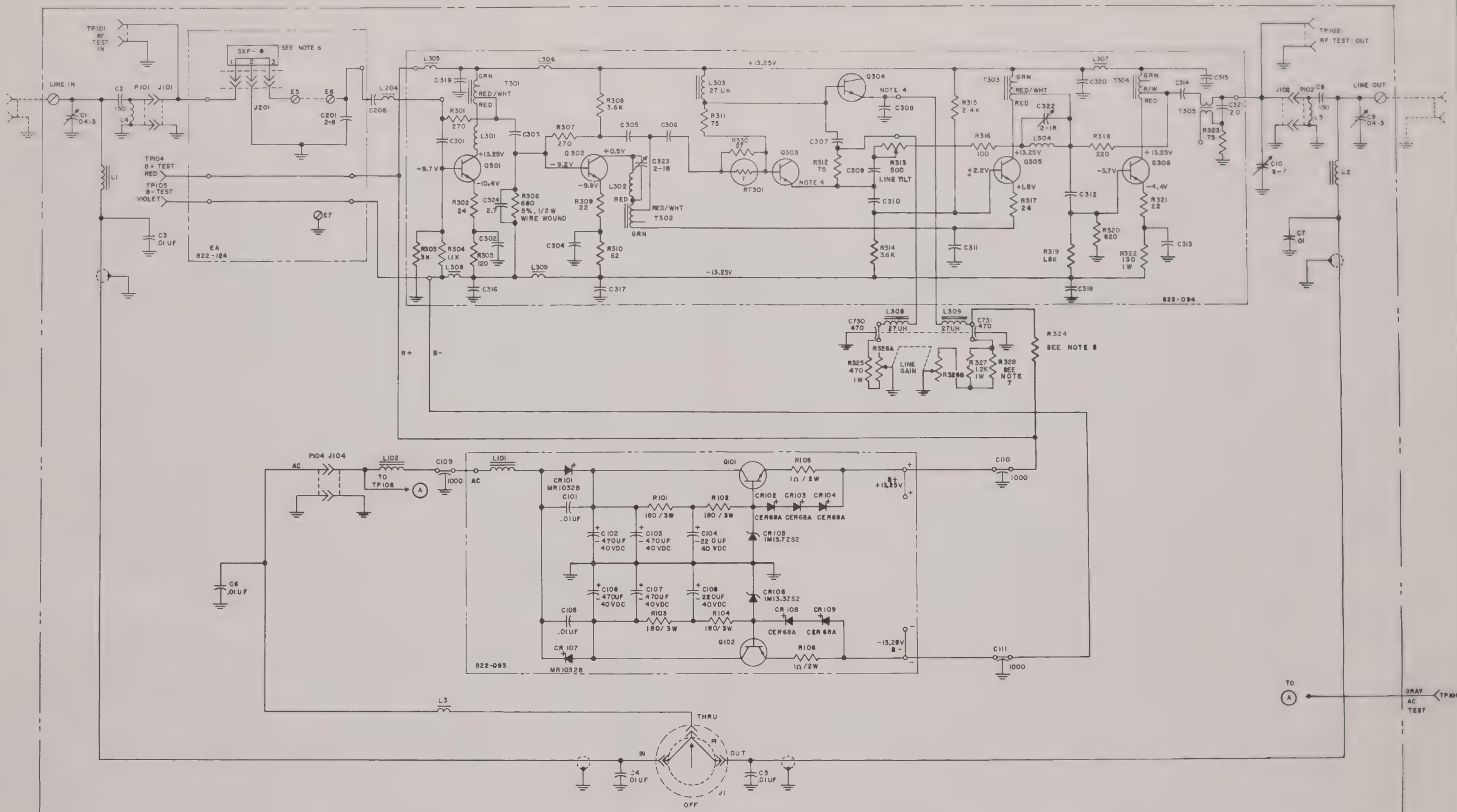
J101 WIRING VIEW

822-094

822-085

822-124

# SCHEMATIC
# STARLINE AMPLIFIER
## MODEL SA-4-AW & SA-4-AW-VI



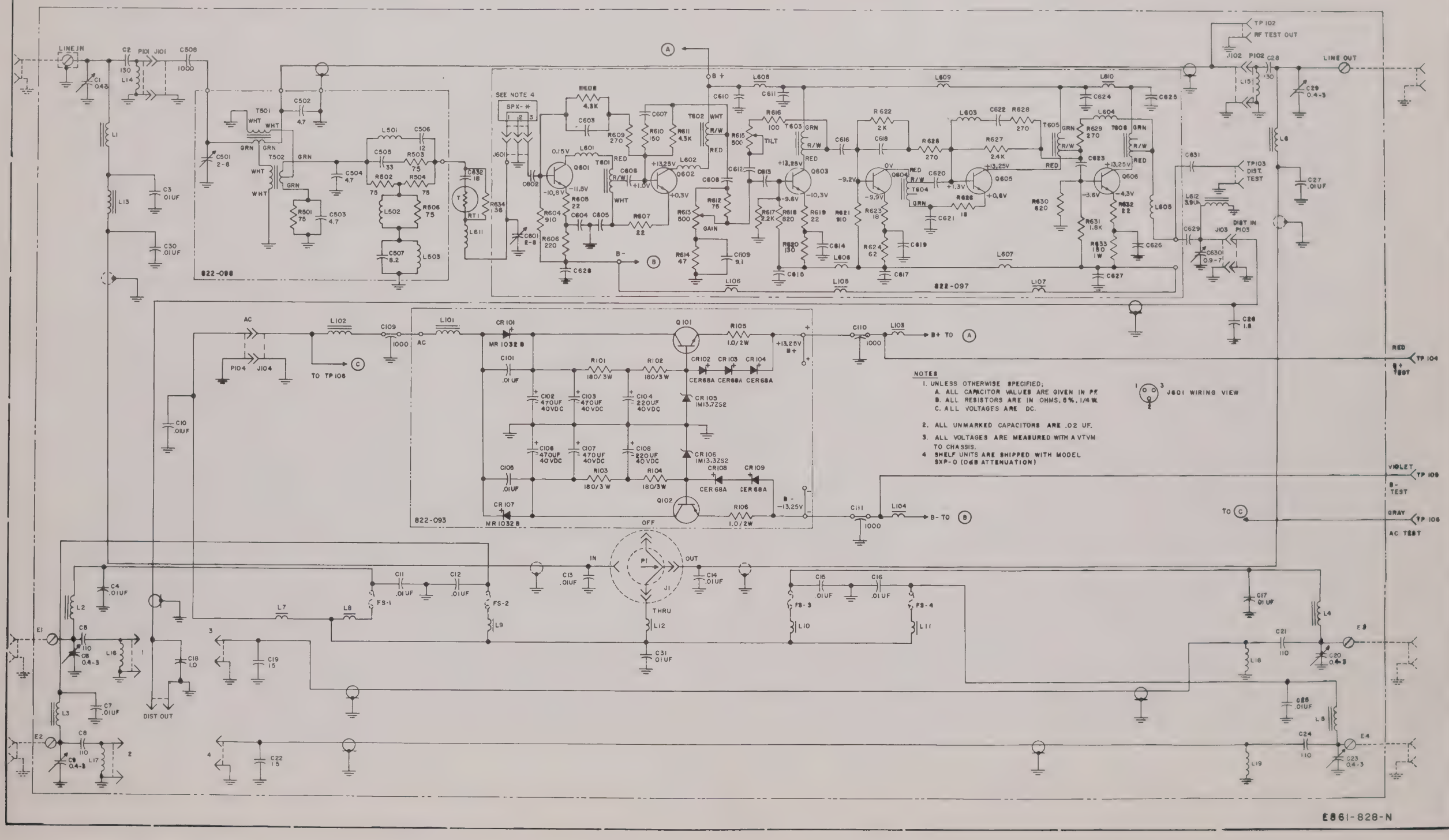

NOTES

1. UNLESS OTHERWISE SPECIFIED;
   A. ALL CAPACITOR VALUES ARE GIVEN IN PF.
   B. ALL RESISTORS ARE IN OHMS, 5%, 1/4W.
   C. ALL VOLTAGES ARE DC.
2. ALL UNMARKED CAPACITORS ARE .02 UF.
3. ALL VOLTAGES ARE MEASURED WITH A VTVM TO CHASSIS.
4. VOLTAGE VARIES WITH GAIN CONTROL CHANGE.
5. R324 TO BE FACTORY SELECTED
6. SHELF UNITS ARE SHIPPED WITH MODEL SXP-0(0dB ATTENUATION).
7. R328 TO BE FACTORY SELECTED (RESISTOR NOT TO BE LESS THAN 910Ω)

J201 WIRING VIEW

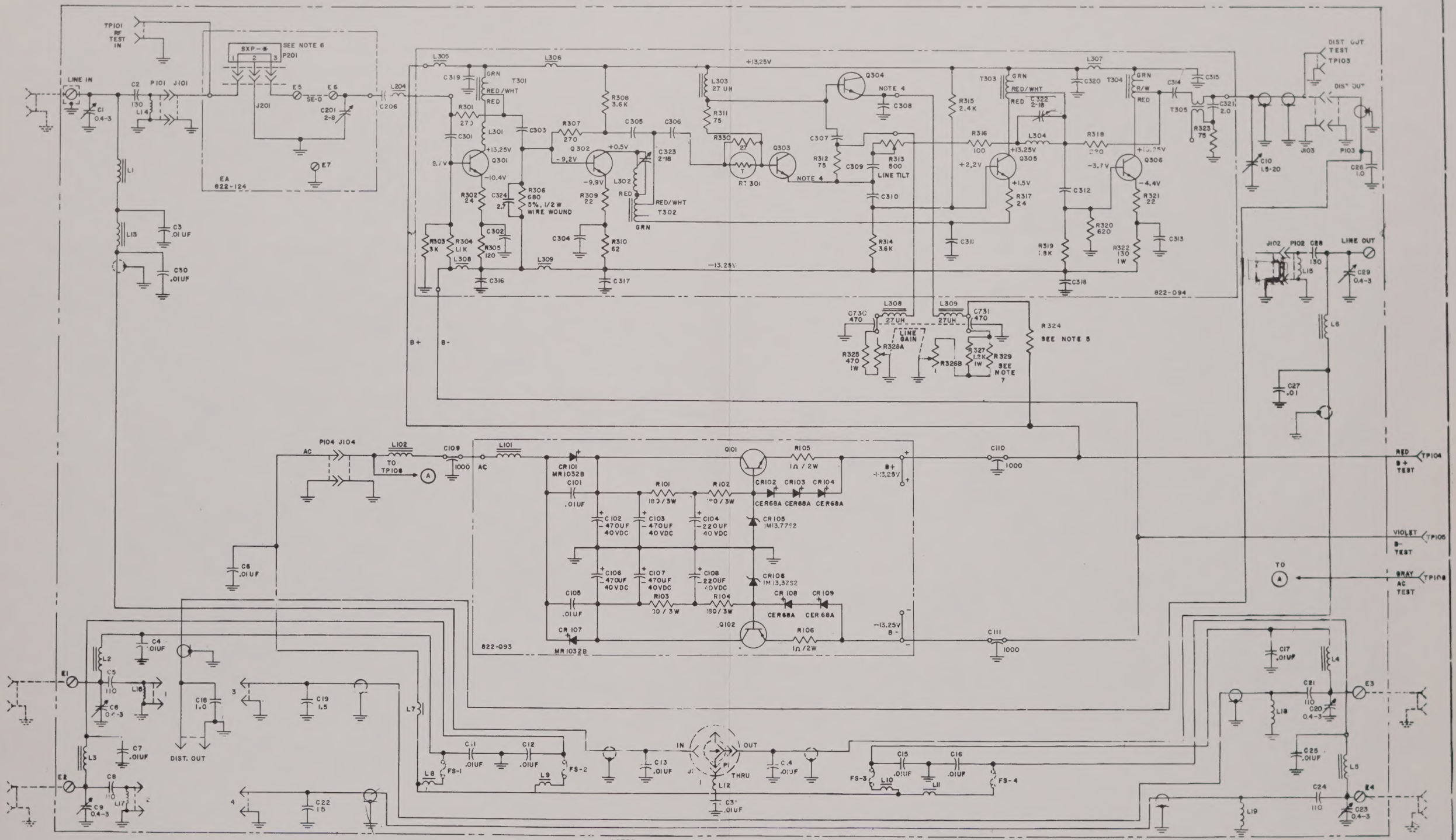
E861-840-S

# SCHEMATIC
# STARLINE AMPLIFIER
# MODEL SA-5AW
# & SA-5AW-VI




E861-828-N

# SCHEMATIC
# STARLINE AMPLIFIER
# MODEL SA-6-AW & SA-6AW-VI




NOTES

1. UNLESS OTHERWISE SPECIFIED;
   A. ALL CAPACITOR VALUES ARE GIVEN IN PF.
   B. ALL RESISTORS ARE IN OHMS, 5%, 1/4W.
   C. ALL VOLTAGES ARE DC.
2. ALL UNMARKED CAPACITORS ARE .02 UF.
3. ALL VOLTAGES ARE MEASURED WITH A VTVM TO CHASSIS.
4. VOLTAGE VARIES WITH GAIN CONTROL CHANGE.
5. R324 TO BE FACTORY SELECTED
6. SHELF UNITS ARE SHIPPED WITH MODEL SXP-0 (0dB ATTENUATION)
7. R329 TO BE FACTORY SELECTED (RESISTOR NOT TO BE LESS THAN 910Ω)

E861-859 REV-N